INDIA RUBBER WORLD

OUR

63rd YEAR

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SEPTEMBER, 1952

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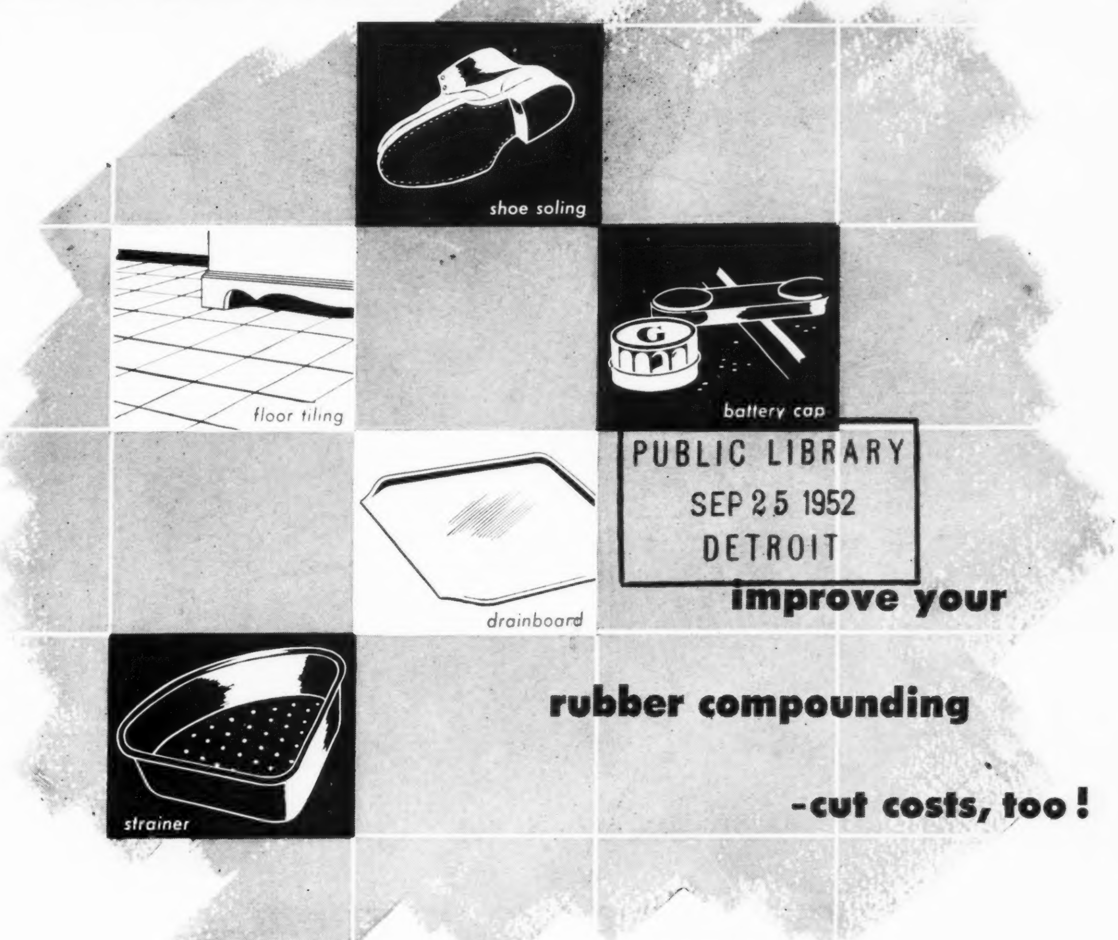
News about

B. F. Goodrich Chemical Company *raw materials*



improve your rubber compounding -cut costs, too!

...WITH Good-rite RESIN 50

GOOD-RITE Resin 50 is an easy-processing reinforcing agent with advantages that cut rubber compounding costs—and improve finished products.

It affords a new and simple compounding approach to hardness problems. For example, it's a means of filling in the gap between soft rubber compounds and ebonites.

More advantages! It saves time by eliminating masterbatching. It gives rubber compounds better flex life . . . higher elongation . . . improved abrasion resistance . . . and easier handling because Resin 50 acts as a plasticizer at processing temperatures.

In extruding gaskets, tubing, coving, etc. —especially on hard compounds—Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

Good-rite Resin 50 is a white, free-flowing powder. It can be compounded in a wide range of attractive colors. Send for technical bulletins. Find out how Good-rite Resin 50 improves rubber compounding, cuts costs too. Please address Dept. [illegible]-5, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar Reg U S Pat Off
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

"TAG" Automatic Controllers Record Temperature, Pressure

Pressure, vacuum or temperature can be automatically regulated and recorded with the Pneumatic Recorder-Controllers produced by TAGliabue Instruments Div., Dept. 67, Weston Electrical Instrument Corp., Newark 5, N. J. These devices maintain conditions for which they are set by varying control line air pressure, which operates a diaphragm valve to regulate flow of fluid (gas, steam, liquid) to the equipment being controlled. At the same time, the instrument continuously records actual temperature or pressure on a circular chart.

Operating on an air supply of 18 p.s.i., TAG Recorder-Controllers handle temperatures between —100°F. and 1000°F., vacuum as great as 30" mercury, or pressures up to 7500 p.s.i.

"TAG" Temperature Recorders Chart from —300° to +1000°F.

Accurate written records of varying temperatures are charted by the Temperature Recorders produced by TAGliabue Instruments Div., Dept. 67, Weston Electrical Instrument Corp., Newark 5, N. J. Temperatures as low as —300°F. or as high as +1000°F. can be recorded with these versatile instruments.

Various types of actuations in TAG Temperature Recorders achieve scale expansion for utmost precision over the working ranges. Interchangeable tube systems are laboratory calibrated at the factory. A safety link provides over-range protection. Details are given in Catalog 1210.

"TAG" Pneumatic Controllers Govern Temperature, Pressure

Pressure, vacuum or temperature can be accurately regulated by the Pneumatic Controllers engineered by TAGliabue Instruments Div., Dept. 67, Weston Electrical Instrument Corp., Newark 5, N. J. These trustworthy devices maintain the conditions for which they are set by varying air pressure in a control line, which in turn operates a diaphragm valve to increase or decrease the flow of fluid (air, gas, steam, liquid) to the equipment being controlled.

Operating on an air supply of 18 p.s.i. pressure, TAG controllers handle temperatures between —100°F. and 1000°F., or pressures between 30" vacuum and 7500 p.s.i.

You get rubber flooring **that's 8 ways better** with PLIOLITE S-6B

PLIOLITE
S-6B

From processing to end product—rubber flooring in either sheet or tile form can be improved 8 ways when you use PLIOLITE S-6B as reinforcing agent:

1 – Easier processability
2 – Fewer rejects due to blisters and uneven flow
3 – Increased hot tear strength, still further reducing rejects
4 – Reduced cure time
5 – Increased hardness
6 – Improved flexibility
7 – Added abrasion resistance
8 – Smoother, glossier surface

Whether you use neoprene, natural rubber, CHEMIGUM, cold rubber or conventional GRS, you'll get these product improvements, too. And PLIOLITE S-6B does not limit color possibilities—even improves aging and color retention in light stocks when used in conjunction with WING-STAY S, Goodyear's use-proved antioxidant.

Try PLIOLITE S-6B—"The Best Known—Known as the Best" rubber reinforcing resin. For details write:

Goodyear, Chemical Division,
Akron 16, Ohio

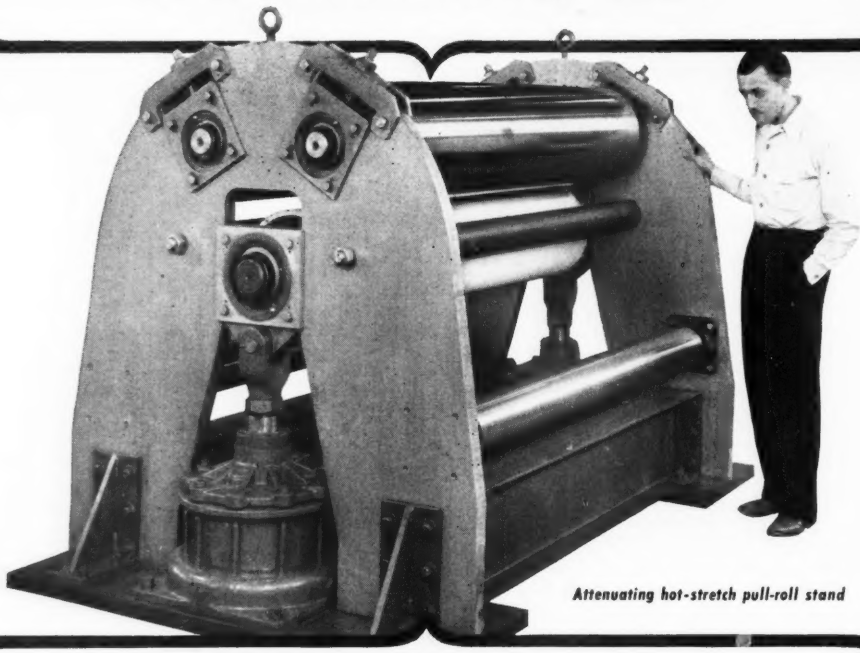
CHEMICAL
GOODYEAR
DIVISION

Chemigum, Pliobond, Pliolite, Pliovic, Wing-Stay—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use Proved Products — CHEMIGUM · PLIOBOND · PLIOLITE · PLIOVIC · WING-CHEMICALS — The Finest Chemicals for Industry

NYLON TIRE CORD LATEXING UNITS

Full Width Fabric
or Weftless Cord Dip Units



Attenuating hot-stretch pull-roll stand

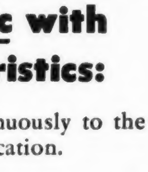
Latest model 101 nylon tire cord latexing units produce full width dipped cord fabric with warp cord of the following characteristics:

- TENACITY . . . . 26 to 28 pounds
- ULT. ELONG. . . . . . 14% to 17%
- ELONG. at 10#. . . . . 5% to 6.5%
- DENIER 840/2
- LATEX ADDITION . . 6% to 10%
- CORD TENSION . 4# to 7# per end
- DRAW DOWN 8% to 12%—at windup
- FINAL MOISTURE 0.75% by weight

- A medium size single unit installation will produce up to 15,000 pounds of treated cord per 8 hours. Units now being built will produce 30,000 pounds of nylon per 8 hours and will deliver this treated cord fabric continuously to the calender for rubber application.

- Units are available for simultaneous impregnation and hot stretching as a separate operation or as a combined unit in train with high speed "Z" or "L" calenders. Units are available to handle woven or weftless fabric construction in cotton, rayon or nylon cord as *a full width fabric.*

Technical data will be sent to interested executives, engineers or technical men upon request on your company letterhead.

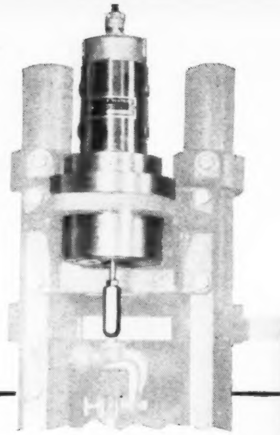


INDUSTRIAL OVENS, INC.

13825 TRISKETT ROAD, CLEVELAND 11, OHIO

Scott's NEW "ACCR-O-METER"

CONSTANT-RATE-OF-EXTENSION WEIGHING SYSTEM

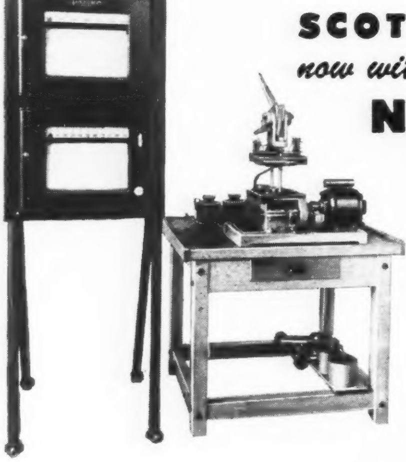


For converting existing Scott Testers to Constant-Rate-of-Extension

TESTS BOTH HIGH- AND LOW-ELONGATION MATERIALS

Our most recent development for tensile testing incorporates an electric weighing system free from inertia, accurate beyond belief. Available as a kit for conversion of existing Constant-Rate-of-Traverse Scott Testers to Constant-Rate-of-Extension. Gives wide versatility enabling a single instrument to test various types of materials, or make various tests on the same material. Tests are permanently recorded on a visual record. Capacities up to 2,000 lbs.

LITERATURE UPON REQUEST



SCOTT NBS MOONEY VISCOMETER
now with
NEW RECORDER and PICK-UP

The combination of a new type Recorder and a new type Pick-up incorporates the following features:

- **Stability of "Pick-up"** — practically indestructible.
- **Zero Adjustment** — easily made by adjustable resistor.
- **Span Adjustment** — readily made by adjustable resistor.
- **Full and Half Scales** — 0 to 100 and 0 to 200 points.
- **Linear Accuracy** — exceptional throughout the scale.

LITERATURE UPON REQUEST

SCOTT TESTERS, INC. 90 BLACKSTONE STREET, PROVIDENCE, R. I.

Scott Testers — Standard of the World

Look what users say about the NEW Pliovic–

In Extrusion Products

"Smoother, more even extrusions"

"Best clarity ever obtained"

"Shortened premix time"

"Much faster extrusions—increased production"

"Closer tolerances maintained"

In Calendered Goods

"Increased calender speed"

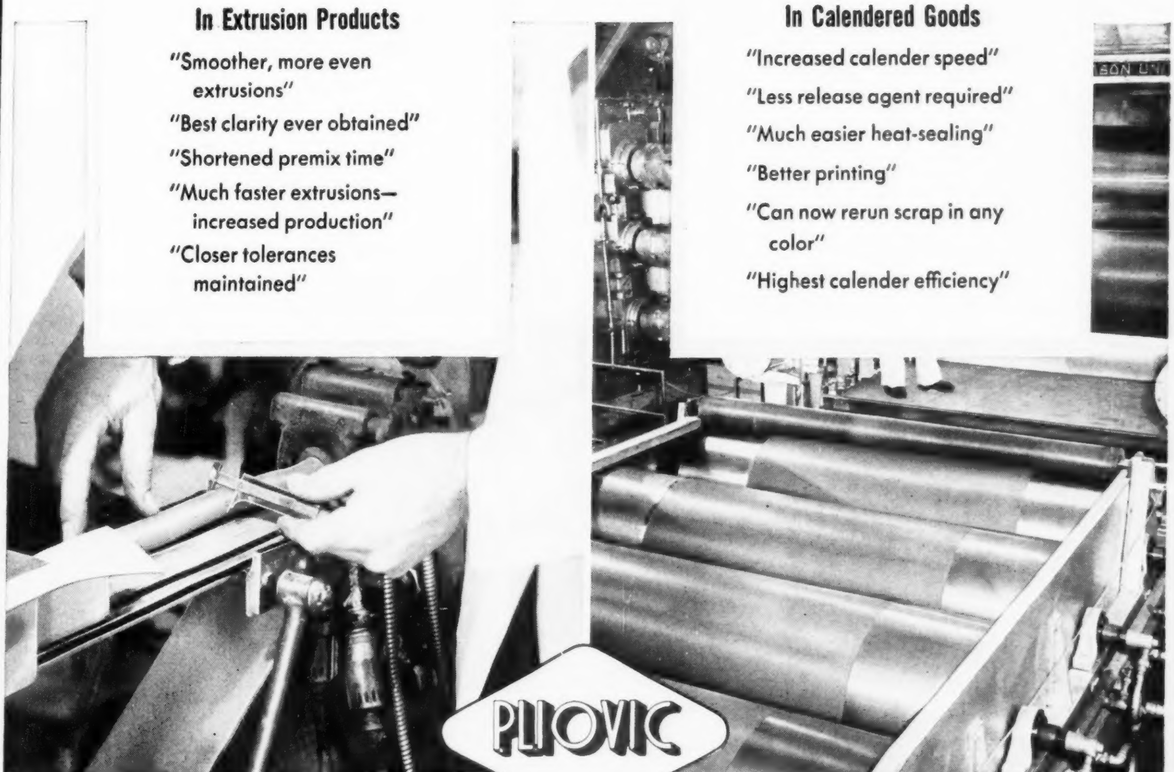
"Less release agent required"

"Much easier heat-sealing"

"Better printing"

"Can now rerun scrap in any color"

"Highest calender efficiency"



Chemigum, Pliobond, Pliolite, Pliovic—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Comments like these from vinyl users have greeted the introduction of the *new* PLIOVIC G90V—first in a series of new polyvinyl chloride resins to be introduced by Goodyear. And they agree that the high uniform bulk density of this new PLIOVIC makes it tops in easy handling, with its excellent thermal stability contributing to higher production speeds and reduction of waste. Thorough evaluation has shown the new PLIOVIC has other advantages as well, such as low water absorption, excellent cold temperature properties, and easy interchangeability with other resins.

PLIOVIC G90V – the *new* polyvinyl chloride resin by Goodyear—can give you these advantages in your plant. It will pay you to write for details to Goodyear – the source of major advances in vinyls. Address:

Goodyear, Chemical Division, Dept. Akron 16, Ohio

CHEMICAL GOOD YEAR DIVISION

Use Proved Products—CHEMIGUM · PLIOBOND · PLIOLITE · PLIOVIC · WING-Chemicals · The Finest Chemicals for Industry

where QUALITY is your first consideration...

THERE IS NO SUBSTITUTE FOR **CRYSTEX**

INSOLUBLE SULPHUR

Now that you can again manufacture white-wall tires, you will want to prevent production losses that occur if a quality insoluble sulphur is not used. You well know the ugly stains and unsalable off-color product caused by sulphur bloom when ordinary sulphur is used. By using CRYSTEX, guaranteed to contain at least 85% insoluble sulphur, you can produce the cleanest and whitest of white-wall tires.

Let us send you our circular which describes CRYSTEX. It lists various applications of CRYSTEX such as tire carcass stocks, white sidewalls, tube-stocks, re-tread and other repair stocks, mechanicals, naphtha cements, latex dispersions, reclaim stocks and bin stocks. Write for your free copy of this Crystex circular today.

Other Stauffer Rubbermakers' Chemicals

Commercial Rubbermakers' Sulphur, Tire Brand, 99½% Pure

Refined Rubbermakers' Sulphur, Tube Brand

"Conditioned" Rubbermakers' Sulphur

Flowers of Sulphur, 99½% Pure (30% Insoluble in CS_2)

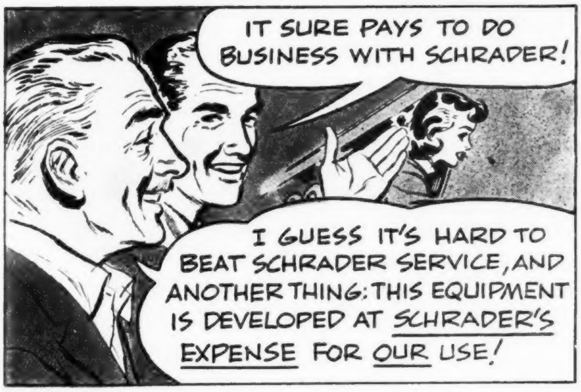
Carbon Tetrachloride
Carbon Bisulphide
Caustic Soda
Sulphur Chlorides
Borax

Stauffer
CHEMICALS
SINCE 1885

STAUFFER CHEMICAL COMPANY

420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

221 North LaSalle Street, Chicago 1, Illinois • 824 Wilshire Boulevard, Los Angeles 14, Cal. • 636 California Street, San Francisco 8, Cal. • 326 South Main Street, Akron 8, O. • Apopka, Fla. • N. Portland, Ore. • Houston 2, Tex. • Weslaco, Tex.



NOTE TO THE TIRE INDUSTRY:

Schrader service extends right to the tube production line. We make available special equipment to help you speed production of pneumatic tubes. Are you taking full advantage of this phase of Schrader service?

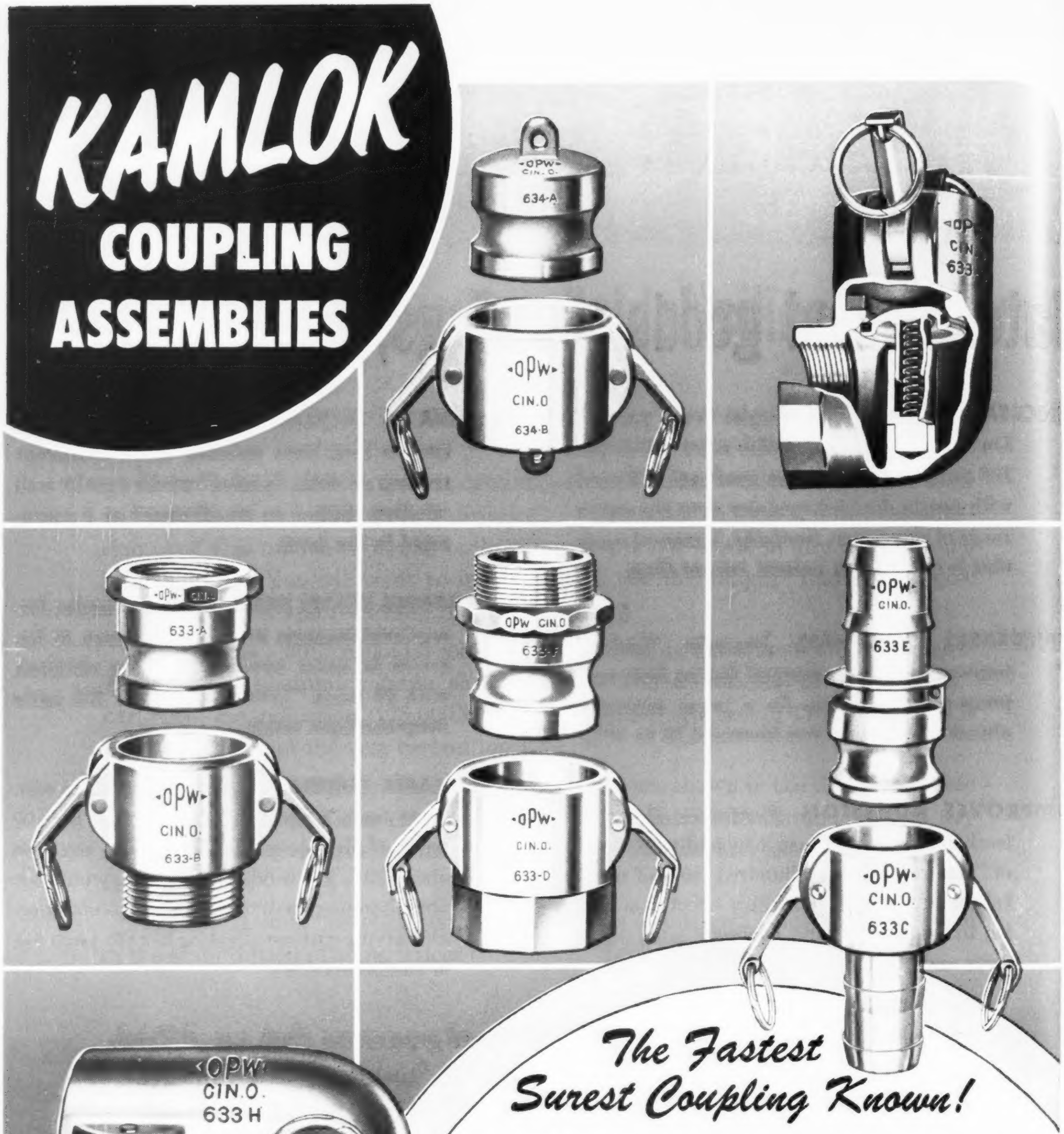
A. SCHRADER'S SON, BROOKLYN 17, N. Y.

Division of Scovill Manufacturing Company, Incorporated

Schrader
REG. U. S. PAT. OFF.

FIRST NAME IN TIRE VALVES
FOR ORIGINAL EQUIPMENT AND REPLACEMENT

KAMLOK
COUPLING ASSEMBLIES



The Fastest Surest Coupling Known!

KAMLOKS positive seal all along the line assures *greater safety* in handling any type of liquid. A perfectly tight no leak connection is made in seconds by sliding coupler over adaptor, then pressing cam levers. No threads to engage, no twisting friction against gaskets, no tools required. KAMLOKS provide long years of economical trouble free service.

Available in any combination to meet coupling requirements in sizes from ¾" to 4" inclusive. Sizes ¾" to 3" precision machined of special hard wear resistant bronze. 4" size of hi-tensil OPALUMIN, (OPW hi-tensil aluminum alloy, as strong as bronze, one-third the weight)—4" in bronze on special order.

Parts A, E, F, are interchangeable with parts B, C, D, G, H, in the same size.

Write for Bulletin F-3 for the KAMLOK Story

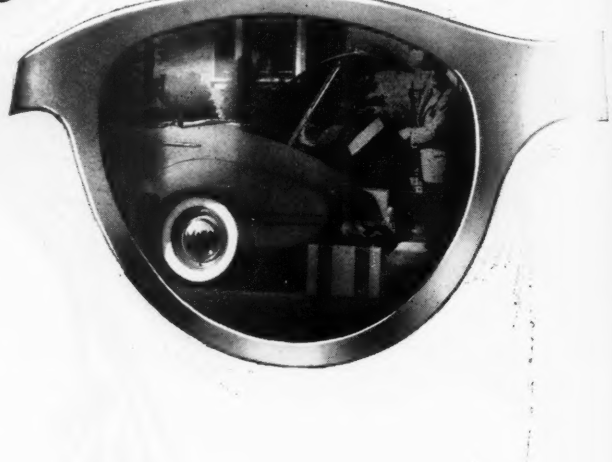
OPW

OPW CORPORATION

2735 COLERAIN AVE. • CINCINNATI 25, OHIO

Valves • Fittings • Assemblies • For Handling Hazardous Liquids

Titanox-for GOOD LOOKS in WHITE WALLS



White sidewalls pigmented with Titanox titanium dioxide pigments are the cleanest, brightest white you've ever seen and they stay that way. Titanox pigments can contribute more to white sidewalls than just good looks. Indications are that Titanox "non-chalking" rutile pigments—especially TITANOX-RA-NC—fortify white walls against crazing, chalking and checking . . . help maintain the even, brilliant original white of new tires.

Physically and chemically stable, Titanox titanium dioxide pigments are compatible with natural and synthetic rubbers, as well as compounding ingredients. Our Technical Service Department is ready at any time to help you choose the best Titanox pigments for your rubber formulations. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

1158

®TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

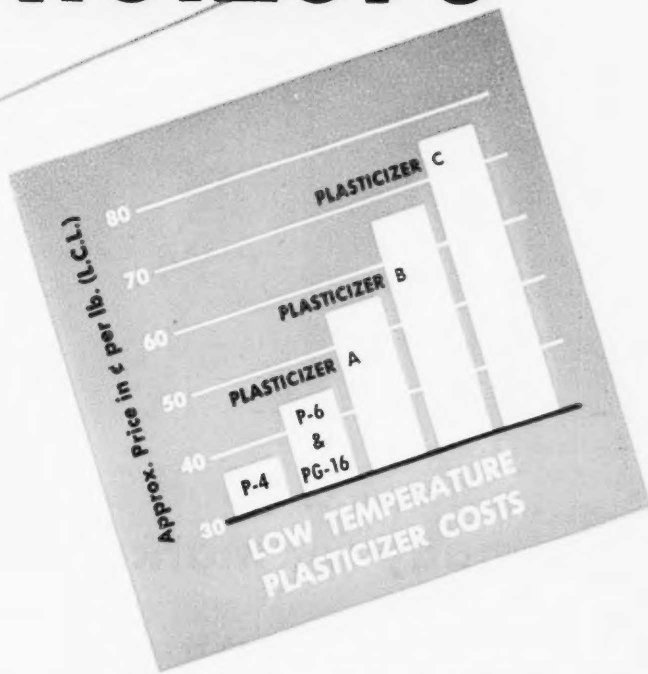
VORLD

AN ANNOUNCEMENT

UNITED CARBON CO., INC.

HOW TO CUT COSTS ON LOW TEMPERATURE / LOW VOLUME SWELL

Plasticizers



Ricinoleates are fully equivalent and, in many cases, superior to the commonly used low temperature plasticizers. An added feature is their extremely low volume swell in aromatic fuels. Their cost is much lower. Check this graphic comparison and you will see that costs can be cut substantially.

Baker Ricinoleate Esters:

PG-16, Butyl Acetyl Polyricinoleate	25% Nitrile Rubber
FLEXRICIN® P-4, Methyl Acetyl Ricinoleate	40% Nitrile Rubber
FLEXRICIN P-6, Butyl Acetyl Ricinoleate	Neoprene GN
FLEXRICIN P-4, Methyl Acetyl Ricinoleate	GRS

Mail convenient coupon for 1 quart samples and technical data sheets. Please clip to your letterhead.

Baker Castor Oil Company
120 Broadway, New York 5, N.Y.

Please send samples of the Ricinoleate Esters checked or Technical Bulletin.

☐ PG-16 ☐ P-4 ☐ P-6
☐ Technical Data

Name__________

Firm__________

Address__________

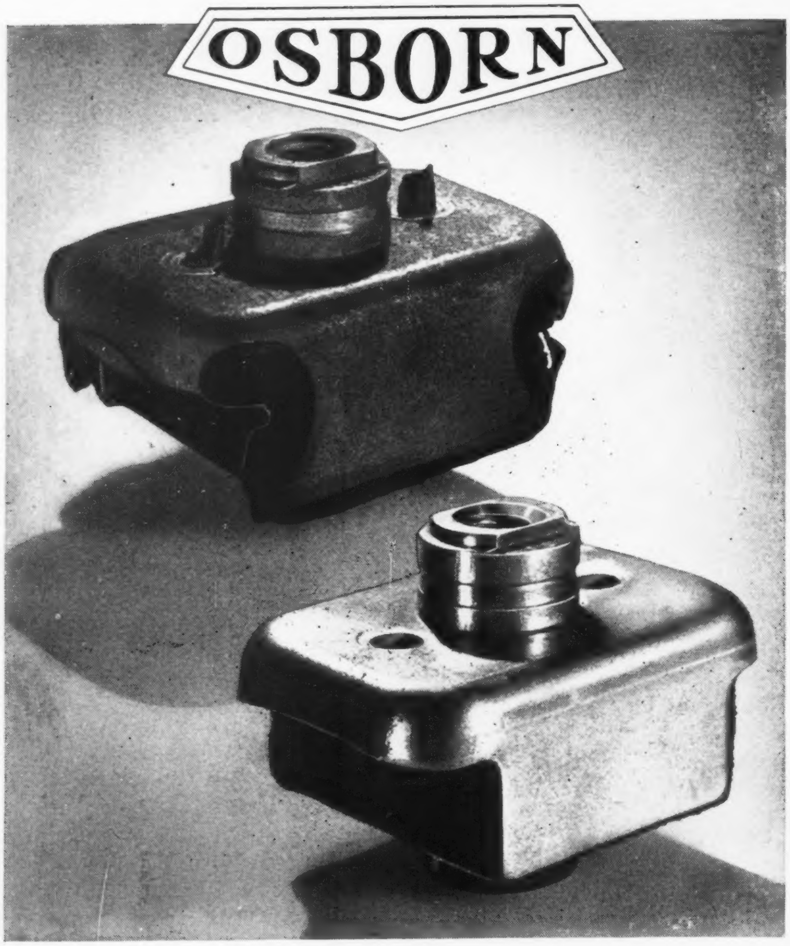
RW-92

ESTABLISHED 1857

THE Baker CASTOR OIL COMPANY

120 BROADWAY, NEW YORK 5, N. Y.

LOS ANGELES • CHICAGO



Makes a good bond ready for marketing

These parts are motor mounts made by bonding rubber to a pressed steel body. On the left, after molding . . . it needs two things: (1) trimming off flash and excess rubber, and (2) cleaning of steel surfaces.

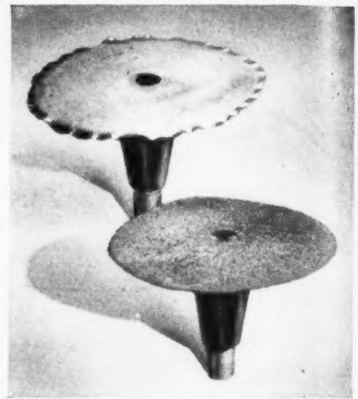
The **O**sborn **B**rushing **A**nalyst has helped manufacturers do both of these things with power brushing *in one speedy operation.* Here, it was a job for Osborn Disc Center* Brushes. These efficient wire wheel brushes remove excess rubber and produce smooth-finished parts quickly . . . as shown on the right.

Ask your nearby **OBA** to study your cleaning and finishing operations to find ways to improve your products and cut your costs. Call him today or write *The Osborn Manufacturing Company, Dept. 826, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

* Trade Mark

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES



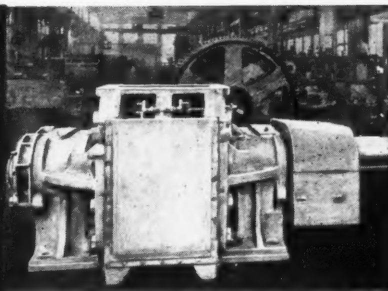
ROUGHED UP. To get better adhesion of valve stem rubber to inner tube, manufacturers are roughing the base as shown (before and after). The same operation removes the flash edge.

OFF COMES FLASH. Removal of rubber flash of rubber-to-steel joints of army tank track shoes is simply a matter of sliding the shoes across the face of an Osborn Disc-Center* Wire Wheel Brush. A mass production operation . . . at the push of a button.

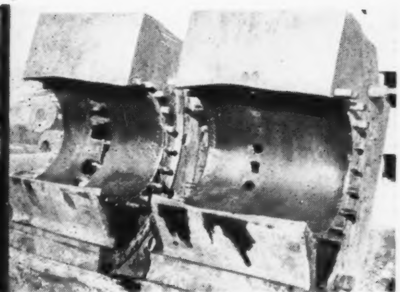
STRATEGISTS. Experienced Osborn research men and design engineers help your engineers develop basic brushing methods and brushing machines to solve cleaning and finishing problems. Their services are yours as a part of the comprehensive service offered by your **O**sborn **B**rushing **A**nalyst. Call your nearby **OBA**.

*Trademark

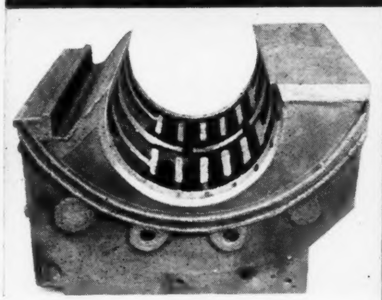
Here's how EXPERTS rebuild your BANBURY



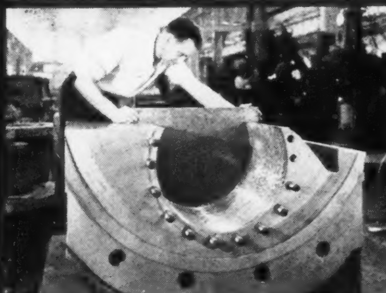
1 As soon as a worn Banbury is received, it is cleaned, dismantled, thoroughly inspected, and magnafluxed for hidden cracks.



2 These sides are very badly worn, but our experts can repair them by inserting new liners.



3 This side has been bored — ready for a new liner to be welded in.

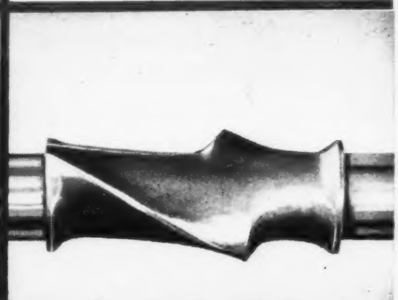


4 Now the new liner is being gauged after having been ground to exact size. The side is now as good as new.

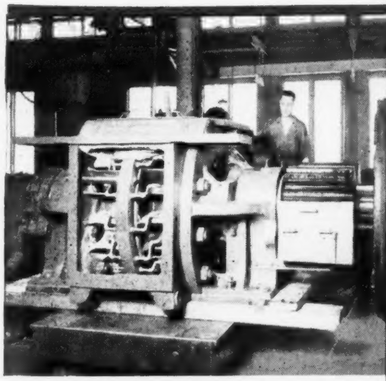
5 Here's a candid shot of a worn rotor. Looks bad — but it's not hopeless.

6 Now the entire rotor has been built up to full original size.

7 With necks rough-machined and body rough-ground, this rotor is now well on the way toward a new life.



8 Here's the rotor with its "new look," all ready for plenty of hard work.



9 And here is the complete rebuilt body, reassembled, tested and ready to leave the shop carrying a new-machine guarantee.

These operations on two of the larger parts are just a few examples of how thoroughly a Banbury mixer body is rebuilt at Farrel-Birmingham. End frames, door top and cylinder, dust stops, thrust collars, connecting gears, and all the other parts also receive careful examination and are either restored to "good-as-new" condition, or, if necessary, replaced.

This work requires the skill, experienced "know-how" and special facilities found only where Banbury mixers are built originally. Why take less than the best? The high quality of Farrel-Birmingham's Banbury repair work cannot be matched at lower prices — or at any price, for that matter.

For complete details, write, wire or phone one of the offices listed below.

FB-771

FARREL-BIRMINGHAM COMPANY, INC.

Farrel-Birmingham®

ANSONIA, CONN. (Telephone Ansonia 4-3331)
AKRON, OHIO, 2710 First National Tower (Tel. Jefferson 3149)
CHICAGO, ILLINOIS, 120 So. LaSalle Street (Tel. Andover 3-6434)
LOS ANGELES, CALIF., 2032 Santa Fe Avenue (Tel. Lafayette 3017)
HOUSTON, TEXAS, 860-A M & M Building (Tel. Preston 4472)

with better

PIGMENT DISPERSION IN ALL TYPES OF RUBBER STOCKS...

PLASTICIZER HSC-13 (LIQUID)

A new, tested plasticizer, HSC-13 offers vital advantages as an aid to mixing and pigment dispersion . . . It cuts down on the mixing cycle and at the same time gives better dispersion, making it possible to increase output . . . HSC-13 will give slightly increased hardness, better flex life, higher elongation and abrasion resistance. It is effective in low grade stocks with high filler content as well as with natural rubber, GR-S, Nitrile or with blends of various rubbers.

PLASTONE (LIQUID or SOLID)

Plasticizer-Peptizer, PLASTONE is non-toxic, practically odorless and does not impart any color to the compound. It greatly improves dispersion of pigments, resistance to abrasion, aging and flex-cracking. Milled and calendered blanks remain firm with minimum shrinkage — an important advantage where automatic cutting of hot stocks is employed . . . PLASTONE smooths out dry, rough stocks, acts as a non-blooming fatty acid, activates thiazole accelerators, reduces viscosity of rubber solutions . . . It has a strong affinity for all types of synthetic, natural and reclaim rubbers.

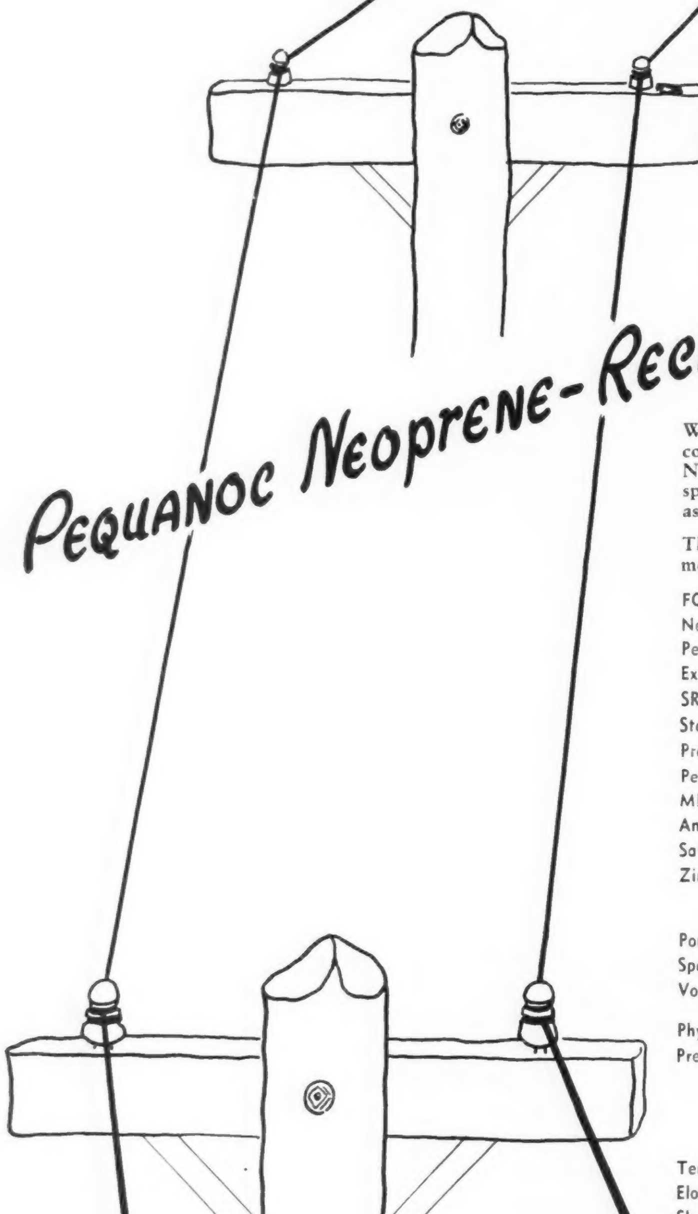
Write for bulletins giving complete technical data on these plasticizers.

HARWICK STANDARD CHEMICAL CO.

AKRON, OHIO

BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES

Weather-Proof WIRE



Pequanoc Neoprene-Reclaim Insulation

Weather-proof wire must stand up for years under continuous exposure to sun, rain, heat, and cold. Neoprene-type compounds are required. And specifications require resistance to oil immersion as well as oxygen aging.

The following is a typical low-cost formula which meets specifications:

FORMULA A 222-7	WEATHER-PROOF WIRE
Neoprene GN A	42.5
Pequanoc "PLANET 25" Reclaim	19.3
Extra Light Calcined Magnesia	1.0
SRF Black	24.0
Stearic Acid	1.0
Process Oil	4.4
Petrolatum	1.0
MBTS	1.0
Antioxidant	.5
Saturated Hydrocarbon	3.7
Zinc Oxide	1.6
	100.0
Pound Cost	.2271
Specific Gravity	1.31
Volume Cost	.2975

Physical Test Data
Press Cure—25 Minutes @ 40 lbs.

	Unaged	Aged 96 hrs. Oxygen Bomb (300 psi 70°C)	Aged 7 Days Air Oven 70°C	After Oil* Immersion 18 hrs. @ 121°C
Tensile	1625	1600	1625	1185
Elongation %	790	770	790	490
Shore Hardness 55				

*SAE #20

A working sample furnished on request.

Pequanoc Rubber Co.
MANUFACTURERS OF RECLAIMED RUBBER
MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

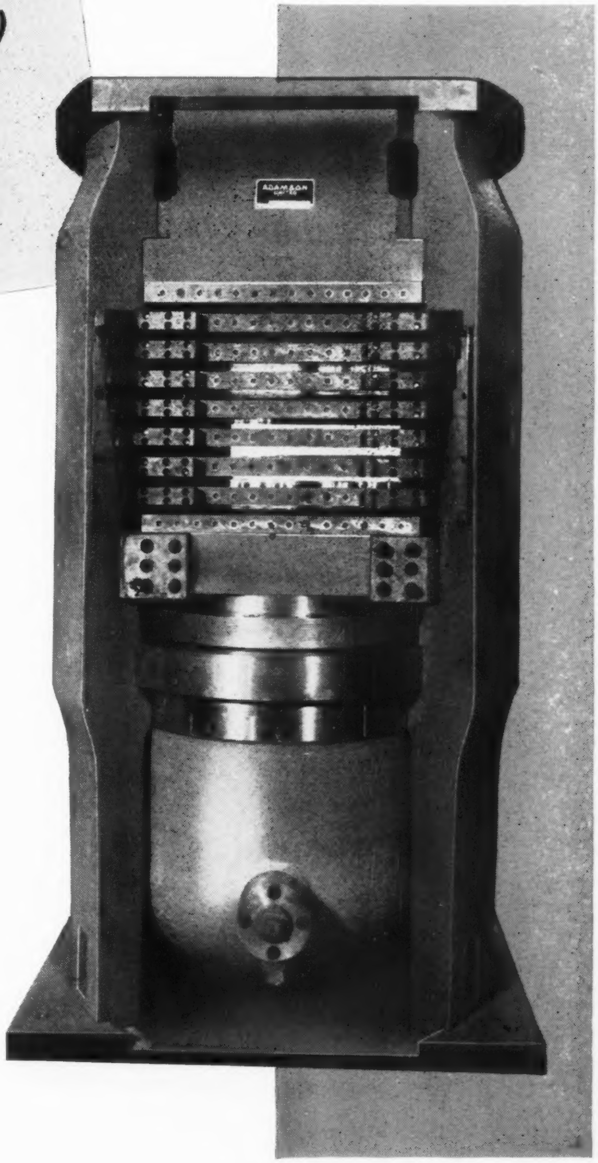
INCREASE PLATEN PRESSURE

45% to 76%

With no change in your present hydraulic lines

...With the NEW

ADAMSON UNITED BARREL PRESS



The new Adamson circular-side-plate, or Barrel Press is designed for high pressure molding of synthetic rubber and rubber plastic products. It provides pressures as high as 1800 pounds per sq. in., or approximately that required for light metal forming, with no change in the hydraulic lines that are now operating conventional, low pressure, rod-type presses.

The new Adamson Barrel Press meets the need for close tolerance, high pressure press work, with a minimum of deflection and resultant "flash" in the manufacture of items such as motor mounts, gas masks, crash helmets, carburetor diaphragms and other molded products. Present sizes range from 12" through 32", with larger sizes available to specification.

We believe you will be interested in the economies the Adamson Barrel Press can effect in your operation from the standpoint of both scrap reduction and accelerated product output. Your request for further information will not obligate you. Why not write today?

ADAMSON UNITED COMPANY

AKRON 4, OHIO

BRANCH OFFICES IN PRINCIPAL CITIES

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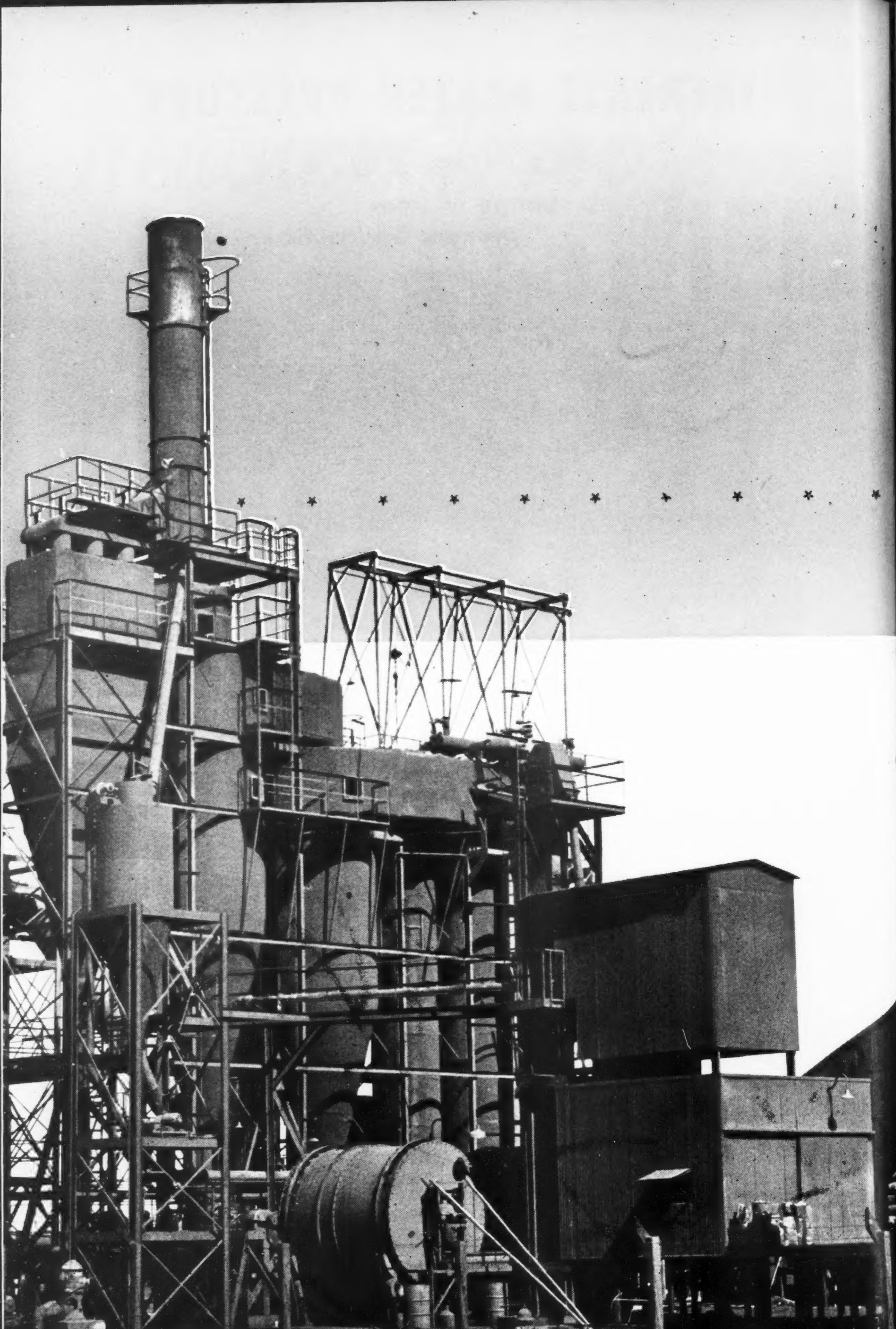

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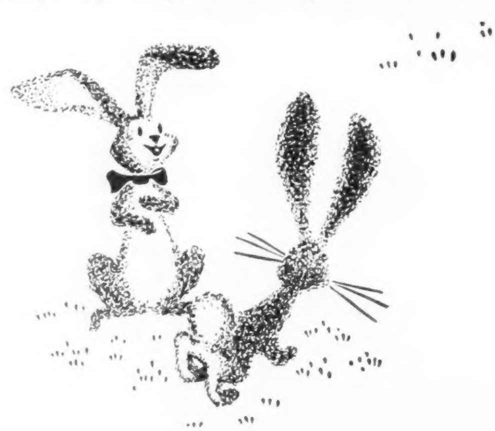

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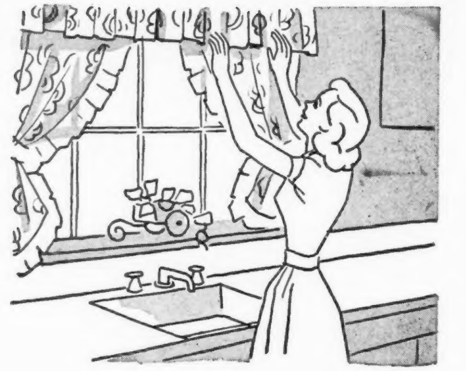

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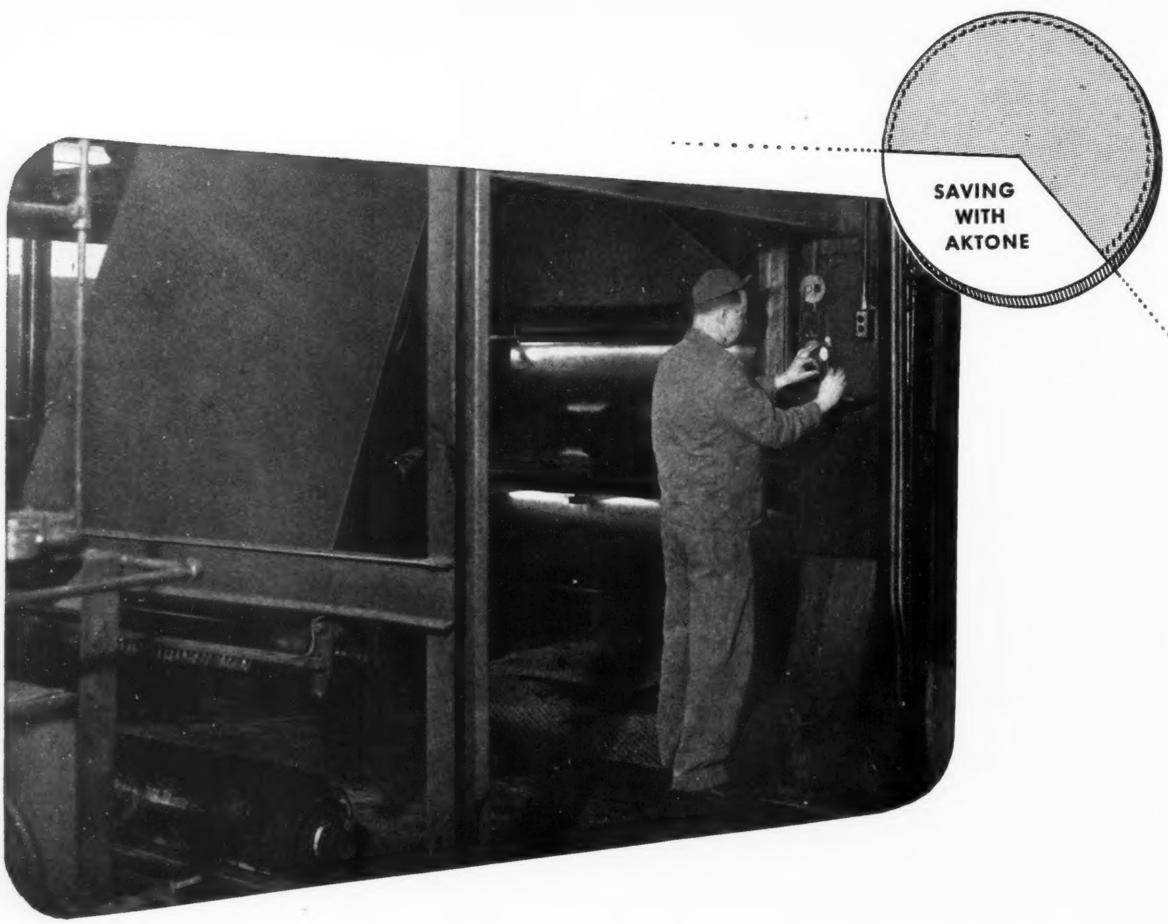
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Relationship of Tire and Car Engineering[1]

E. A. Roberts[2]

THE American motoring public has learned to expect almost yearly progress in its motor cars and its associated products. The automotive industry has been so competitive, and the public so receptive to new developments, that rapid progress has been the keynote of existence and has resulted in the present high status of accomplishments.

Cooperation between automobile and tire engineers has always resulted in benefits to both, and the following is a discussion of the factors that mutually affect car and tire performance.

Factors in Car Engineering That Affect Tire Performance

Proper front end alinement is one of the fundamental reasons for good tire performance. One half degree of positive camber is sufficient, and greater camber produces faster and more irregular tire wear. Toe-in from 1/16 to 1/8 of an inch is the recognized limit, and toe-in of 1/4 of an inch is sufficient to cause a decrease of 15-20% in tire life.

Camber and Toe-In

An analysis of the forces and effects produced by camber and toe-in indicates very clearly that these forces and effects are not related. Camber produces a long and a short radius on the inner and the outer edges of the tire, and toe-in produces a slight side scuffing across the entire tread. A study of the tread motion resulting from these two factors shows them to be entirely unrelated.

Thus camber and toe-in should be set with their own respective gages and never on the roll-on or scuff-type gages that prescribe a certain toe-in for existing camber.

Independent front suspensions can cause toe-in and camber change during spring deflection, and the car designer has the task of holding these changes to a minimum.

Caster has never been found to affect tire life, and the amount used will depend largely on the amount required for good steering.

Some of the newer engines in present-day automobiles develop enough torque during power application to force the two rear tires slightly ahead while the center of the axle remains stationary, thus resulting in a toe-in condition and wear on the inside of the rear tires. A study of the tread motions showed that this condition could be corrected satisfactorily by either toeing-out the axle or increasing its fore and aft stiffness.

Weight Distribution

A study of the front and rear weight distribution of cars made 15 to 20 years ago *versus* present-day models shows that the percentage of weight in the rear of the car has been steadily decreasing. Cars formerly had 50-53% of the weight on the rear, but now many have only 43 to 46% of the weight on the rear tires.

As a result of this trend and the increases in engine horsepower, the rear tires have as much as 79% more horsepower to weight ratio than in the earlier models, and this adds up to a real problem on traction, especially at today's speeds.

With regard to speed, information collected by the National Bureau of Public Roads shows that in a recent analysis of 189,412 vehicles, passenger cars have average speeds as follows: (1) Speeds exceeding 50 miles per hour were found for 42% of the cars. (2) In the Midwest and the West more than 50% of the cars are operated above 50 m.p.h. and 18% exceed 60 m.p.h.

The National Safety Council has issued figures showing that skidding is by far the cause of most accidents. A spinning tire has very little traction, and, with the present lower rear weights, plus new high torque engines, it is a comparatively easy matter to break traction of the rear tires on wet, slippery roads.

Factors of Tire Engineering That Affect Tire Performance

Quite often one is inclined to regard tire design as a compromise. A prime example of this situation is with regard to traction where many attempted improvements have resulted in increased noise and faster tread wear.

Real progress consists of making improvements without creating any bad effects; so let us analyze the principal tire problems and some new developments that work out to be practical accomplishments.

[1] Presented before the Society of Automotive Engineers, Detroit, Mich., Mar. 6, 1952.

[2] Vice president in charge of research and development, Armstrong Rubber Co., West Haven, Conn.

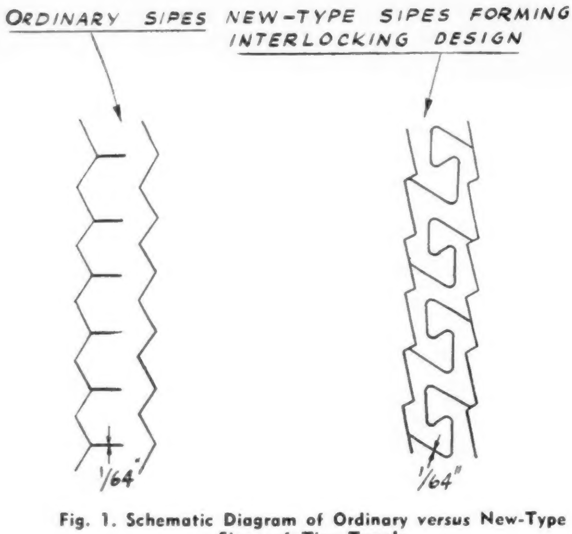


Fig. 1. Schematic Diagram of Ordinary versus New-Type Sipes of Tire Treads

Traction

The problem of improved traction is the No. 1 safety problem facing both car and tire manufacturers. Traction is required for braking, and safety demands that a car be able to decelerate rapidly to avoid accidents. Starting traction is important on snow and ice, and lack of traction in this respect is an annoyance as well as safety hazard.

The type of traction that is most important, however, is the forward and side traction of a rolling vehicle at high speed. We all know that sliding traction can develop coefficients of friction 40-50% lower than rolling traction. Furthermore, with the new, more powerful engines, it is possible to break traction and spin the rear wheels on nearly every type of wet or slippery pavement; in which case the coefficient of friction is even further reduced. This factor can and does account for the greatest number of skidding accidents and represents a field where major improvement is necessary.

The following are factors that affect traction:

1. Designs producing greater flexibility allow the tire to cling better to the road as well as conform to the irregularities; therefore, more flexibility represents better and more constant car control.

2. The number and the angle of lateral edges of the tread probably constitute the biggest factor in the traction developed. This point is especially true if the units are so designed that the strains of traction cause them to distort and tip, thus allowing one edge to project above the surface of the tread, as in the case of isolated units, which are recognized as having good traction.

Another factor to be recognized is whether the edges of the tread have a chance to function. If the sipes[3] or traction slots are part of a solid rib, the firmer solid part of the rib carries most of the load; consequently the siping is only partially effective. (See Figure 1.)

3. Side thrust can close or nearly close the outer tread groove, resulting in a dangerous reduction in side skid resistance.

4. The present extra-low-pressure tires have relatively narrow treads and, owing to the wide section of the tire body, this type of tread definitely tends to exert more intensity of pressure on the outermost or shoulder ribs in pavement contact. Proof of this type of action can be readily seen by watching tire marks following sudden application of brakes on a wet road. The tire marks will show that the major job of stopping the car has been done by the two outside ribs.

In an effort to provide better traction, a new design was developed, the main principle of which is to break the ribs up into interlocking elements; each element has a bulbous end which, in turn, is enclosed by the adjacent element. (See Figures 2 and 3.) Thus, in normal running, the tread elements act as a rib by supporting each other, and, when needed for traction, they break up into separate elements and provide the flexibility and extra edges required for better traction. (See Figure 4.) Also, since the tread pattern is composed of these elements formed into a rib-like design, the sipes are very effective. The elements support the load, and their edges have positive contact with the pavement. In the case of straight sipes, part way across the ribs, the solid part of the ribs carries the load and makes the edges produced by the sipes far less effective from a traction standpoint.

In order to prevent closure of the grooves, small spacers were put intermittently between the ribs in the grooves. These spacers do not contact in the inflated tire, but prevent the forces of deflection and cornering power from closing the grooves.

Another feature of this tire is the tread contour, which has a dead flat center with rounded shoulders. This-type construction puts a very definite hump in the area of the intermediate rib, causing much more positive contact of this rib. In this way good pavement contact is established nearly all the way across the face of the tread instead of being good only on the outer ribs.

There are so many ways of judging traction that it is hard to put an evaluation in percentage on any improvement. For example, a tire must be judged on stopping distance, both rolling and sliding, starting pull, side slip on curves, contact with the road at high speed, etc.

It can safely be stated, however, that traction in all respects is decidedly improved in the above-mentioned

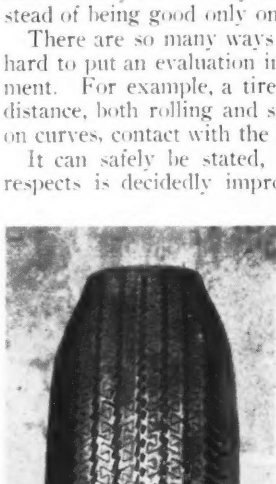


Fig. 2. New Tread Design with Interlocking Elements (Note Profile with *Flat* Center)

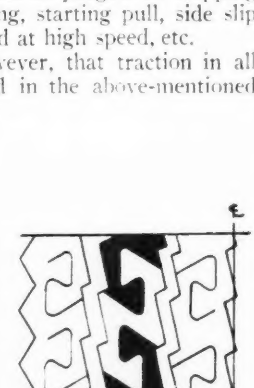


Fig. 3. Diagram of Interlocking Elements in New Tread Design (Alternate Units Shaded)

[3] Sipes are extremely narrow auxiliary grooves about 1/64-inch wide added to a tread design for the purpose of increasing traction.

tire when compared with that of all previous designs. The biggest improvement, however, derives from the fact that the added flexibility and exposed edges of the tread elements make it much more difficult to break them loose from the pavement at high speed, and this fact supplies the most valuable safety factor needed in modern and future tire and car engineering.

Noise

The new tire that I have been describing is not a rib tire, and the numerous elements interlocking to form the tread could readily cause enough noise to make this tire commercially unacceptable.

Before discussing the remedy used to make this a quiet running tire, however, I want to analyze the cause and past history of noise treatments. Pavement growl, as the most common noise is designated, is caused by a series of minute pounding noises made by the tread elements striking against the pavement. This noise is transmitted to the tire body, which is composed of tightly stretched cords, and the resultant sound is either airborne or telegraphed to the occupants of the car.

The most annoying form of noise developed by a tire is produced when all of the tread elements produce a sound of a single pitch. For that reason most tires made in the past 16 to 18 years have had a series of pitch changing patterns incorporated in the design so that the pitch varies and does not reach the ear as a single pitch. This pitch variation could very well be likened to a sine curve to represent the tone rising and falling two or more times in the revolution of a tire. This use of pitch changing patterns produced dissonance instead of resonance and has been fairly effective, being less disturbing to the human ear.

When siping was introduced, these sipes were put in the same sequence as the design pattern, and they added very materially to the total overall noise level of the tire and had to be used sparingly.

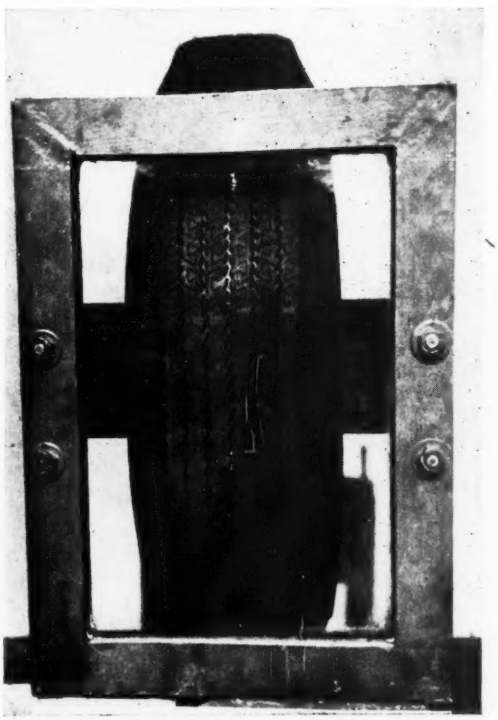


Fig. 4. Deflected New Tread Design under Glass; Note How Elements Support Each Other

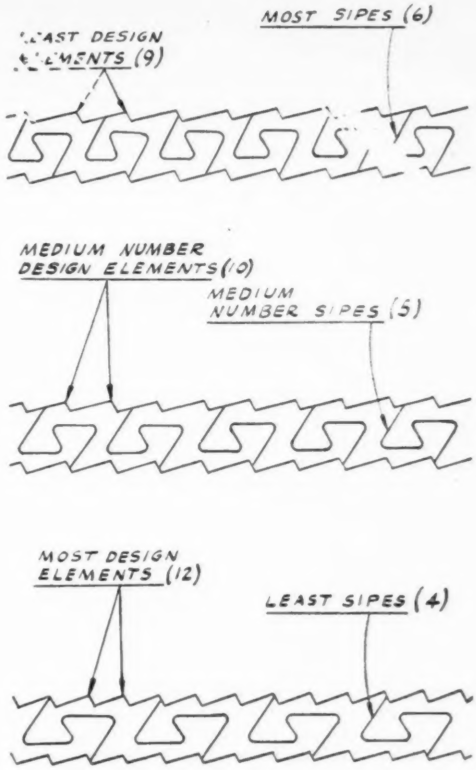


Fig. 5. Drawing Showing How Resonance Is Counteracted by Using Sipes in Inverse Ratio to Number of Design Elements

It was instantly realized that an improved noise pattern was necessary for the amount of siping used in the proposed new tire. A new noise treatment was developed and consisted of putting the greatest number of sipes in the section of the tire having the least number of design elements, and the least number of sipes in the section having the most design elements. (See Figures 5 and 6.) This arrangement produced a very pronounced dissonance effect since the sequence of the sipe frequency caused it to diverge constantly from the design frequency.

Squeal

Most tire squeal is caused by vibration of the shoulder rib of the tire toward the outside of the curve of the road. When a car is driven around a turn fast enough to cause this rib to slide, the latter vibrates as it begins to slide, generally producing a high pitched squeal. Tires with wide outer ribs and with flat tread contours put more concentration of pressure on the outer rib and are worse in respect to tire squeal.

In study of this problem, it was determined that treads with very narrow outer grooves were better for squeal resistance because the thrust of cornering allowed the two outer ribs to contact, thus muffling squeal to some extent. This closure of the groove, however, is poor from a traction standpoint.

The idea was then developed of putting spacer bars between the ribs so that the outer rib could readily contact the intermediate rib, by means of the spacer, and thus muffle the squeal. (See Figure 7.) This muffling eliminates almost all squeal and entirely eliminates the annoying high pitched squeal mentioned above. The introduction of the spacer bars is an entirely practical feature that can be incorporated in cast-type tire molds. This design also has other desirable features such as

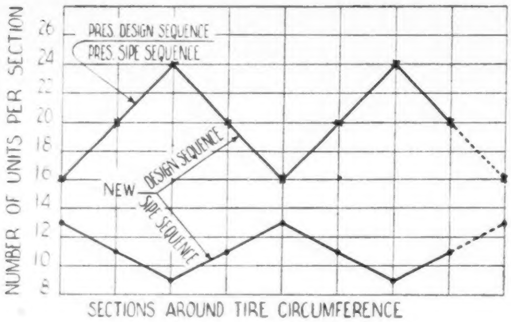


Fig. 6. Present *versus* Divergent Noise Treatment

holding the tire tread groove open for better side traction and reducing the stone holding tendencies of the tread to some extent.

Tire Thump

Tire thump can be described as a rhythmic pounding of the tire on the pavement once each revolution, and this pounding is transmitted to the occupants of the car. The basic cause of tire thump is a variation in the carrying capacity of the tire around its circumference, and this causes rhythmic axle acceleration or hop.

Tire thump is not a cause of tire failure, but is a definite annoyance and is much more pronounced in the larger, heavier cars, primarily because they usually run more quietly otherwise.

Some even more specific reasons for tire thump could be described as follows: (1) heavy tread splice; (2) constriction due to crossed or heavy ply splices; (3) uneven growth of tire dimensions in use; (4) a flat spot in the tread caused by skidding; (5) spotty tread wear.

In all but the last of the above cases the thump can occur on a new or practically new tire and results in some of the most difficult servicing problems encountered by either car or tire manufacturers. It is often difficult to determine which tire is thumping and may require changing all four tires on a car.

Some of the means employed by tire makers to eliminate tire thump are the following: (1) better control of tread contours; (2) reduction of the amount of tread shrinkage and better uniformity of splices; (3) use of narrow ply splices with no splices crossed in the crown of the tire; (4) better control of cord fabric bias angle and tire expansion in order to reduce variation in tire growth.

No real progress can be made in evaluating these various improvements or the workmanship involved unless an overall thickness gage which will measure the entire circumference of the tire is used.

Stability and Handling

From the standpoint of tire design, good car stability and handling are obtained by use of the proper tire cord angle and proper tread dimensions and contour. The longer the cord, the better the stability. There is very little latitude in this respect, however, because cracking of the tread rubber would result with cord angles which produce an exceptionally long cord.

Tread design and contour can be varied, however, to make improvements in stability. In tires with the flatter treads, the shoulder rib handles the brunt of the forces which produce lack of stability, and the shoulder rib, therefore, has to be wide enough to maintain the necessary stability.

The new tread contour previously described, consisting of a flat center portion with rounded shoulders, is effective from a stability standpoint because some of the stress of cornering is transferred to the second rib. The addition of the spacer bars in the outer groove also adds to stability by making these two ribs act somewhat as a unit.

Wider rims, of course, improve stability by giving the tire a wider foundation. High inflation pressure also increases stability, but at the expense of riding qualities. The only real gain that can be achieved for both the tire and the car engineer, therefore, is by increasing the lateral stiffness with no decrease in the vertical stiffness of the tire. In other words, the tire should be easy to deflect up and down, but hard to distort sideways.

Riding Comfort

The main factors contributing to an easy riding tire follow: (1) lower inflation pressure; (2) softer rubber compounds; (3) proper cord angle to produce a shorter cord length; (4) flexibility or ability of the tread design to adapt itself to road irregularities.

Most of the gains in riding comfort made in recent years have come about as a result of the use of lower inflation pressures, and very little gain can be accomplished from the standpoints of compounds or cord angle without affecting the tire radically in other respects. A decided improvement in riding comfort is made, however, by the use of a flexible tread design with interlocking elements.

Ease of Steering and Parking

Ease of steering and parking has become more of a problem with today's cars because of the heavier weights on front axles and the use of the larger, lower pressure tires. This problem is especially difficult with heavier cars and women drivers. A narrow width tread steers better when it is new, but narrow treads have a tendency to wear to a round contour on the front wheels, and the narrow width treads then become harder to steer because of the longer road surface contact developed. Improved steering is noticed in such treads when the rear tires are changed to the front since the rear tires wear less round than those in front.

The tread contour described previously (with a flat center and rounded shoulders, shows considerable improvement in steering ease because the higher intensity of pressure occurs on the intermediate instead of the shoulder ribs, thus reducing the moment arm from the

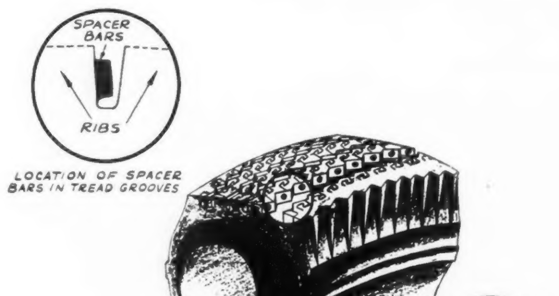


Fig. 7. Diagram Showing Spacer Bars between Ribs and Location of Spacer Bars in Tread Grooves

point of greatest intensity of pressure to the center of the tread. This action gives a higher mechanical advantage to the driver during turning or steering.

Irregular Tire Wear

Irregular wear on front tires has always been a problem to both tire and car engineers. Rounder treads are worse in this respect because they have more lateral motion during deflection. The most pronounced irregular wear, however, is the so-called "oxbow" type of wear, which is caused by fast wear on the intermediate rib and is due largely to insufficient intensity of pressure on this rib. Cuppy and uneven wear often result from this type of wear.

Based on the theory that insufficient intensity of pressure on the intermediate rib causes relatively more lateral motion of the tread with reference to the road surface, many tires have been designed with the intermediate rib projecting 0.03- to 0.04-inch above the contour radius. This projection often disappears, however, when the tire is inflated. The new tread contour we have mentioned is designed to project above the radius by 1/8-inch.

This new tread is nearly flat across the four center ribs with well-rounded shoulders, and this new contour gradually wears to about the same shape as most of the present new tires. This contour gives unusually good resistance to oxbow-type wear and cupping because the intermediate ribs are pressed more firmly against the pavement, resulting in less lateral motion in this area.

The new contour is not proposed as a cure-all for all cases of unsatisfactory front tire wear, and rotation of tires is still recommended for best all-around results. This development did, however, permit us for the first time to run front tires in that position under test fleet conditions for as long as 29,000 miles without development of oxbow or cuppy type of wear.

Tire Balance

Cars have been improved so much from the standpoint of shimmy and tramp that good static balance of rotating front wheel parts is all that is necessary in most cases for satisfactory car operation.

Dynamic balance, of course, is an additional improvement and is sometimes necessary for satisfactory operation where either puncture-proof or diaphragm-type safety tubes are used.

Tire Durability

Tires have been constantly improved from the standpoint of durability. Flatter treads and improved compounds have periodically improved tread durability and service life. In fact, this aspect of tire life has been somewhat overemphasized, and many good ideas have been passed over in order to make tires increasingly more durable.

The use of rayon in tires has given them greater strength, and improvement in the rayon cord itself has increased the fatigue resistance to the point where much more severe test conditions are necessary to evaluate rayon tires from this standpoint than for those made with cotton cord. The cord dips or the compounds bonding the cord to the rubber have been improved to the point where they are actual chemical bonds.

Tire Testing Methods

Tire manufacturers have had to maintain extensive road test fleets as the only satisfactory means of testing tread life, cracking, and fatigue resistance. Tire tests by fleet operation proved a grueling type of trial with the use of more than normal loads on smaller than recommended tires for a given application, run at low inflation pressures for a distance of 24,000 miles a month.

Design tests are run with the tire held in one position on the car in order to develop the wear characteristics of each position. Flex fatigue tests are run in the same direction of rotation to repeat the identical stress throughout the life of the tire.

Fabric fatigue and separation tests are run on various types of laboratory test wheels. In the case of fabric fatigue tests a special contour has been developed that produces more bending moment than the conventional tread shape.

Conclusions

In conclusion, it is obvious that tires must play an increasingly helpful part in the progress of the American motoring public, not only for durability, but also from the standpoint of greater traction, safety, quietness, ride quality, and car handling characteristics.

World-Wide Survey on Plastics[1]

DORNBUSCH & CO., Krefeld, manufacturer of machinery for finishing and embossing plastic sheet material, recently instituted a research tour of foreign markets which covered South America, Japan, Australia, and India. The report naturally concentrates on those aspects that are of importance to the firm in question.

In South America, it says, PVC sheet and PVC-coated artificial leather are produced in Argentina, Brazil, Chile, Colombia, Uruguay. The raw materials are imported chiefly from the United States. In Brazil an auxiliary of the Goodrich company will start producing PVC in 1953, which should reduce imports by this country. Designs are wholly influenced by American styles. Most firms still use the older types of machinery and even obsolete machines, but efforts are being made to acquire modern equipment in order to be able to eliminate the very considerable imports of finished goods. Production is at present for home consumption only.

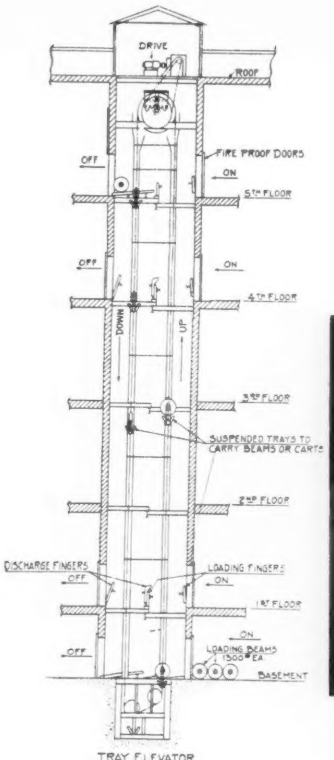
Japan's equipment is also for the most part old and often obsolete, and modernization is precluded by the financial situation. The raw material situation, however, is due to improve by the establishment of a branch of the Monsanto company. The Japanese plastics industry is geared mainly for export trade. In printed materials, checks and plaids in one or two colors, small figures and flowers in neat patterns, seem to predominate. Multi-colored effects are achieved by means of decals on high-finish surfaces. Fine effects are aimed at in embossing, as calf and pigskin grains, taffeta, silk, and satin imitations.

Factories in Australia are conspicuous for cleanliness and order; they are now undergoing modernization. Production, chiefly for home consumption, closely follows English styles. Little interest is shown in the production of artificial leathers, since the country is abundantly supplied with natural leather; on the other hand, there seems to be a tendency to replace textiles by plastics.

The extreme poverty of a large part of the population of India does not encourage the use of plastics. A

(*Continued on page 786*)

[1] *Kunststoffe*, 42, 186 (1952).



New Six-Story Conveyor Saves $25,000 a Year at Firestone Plant

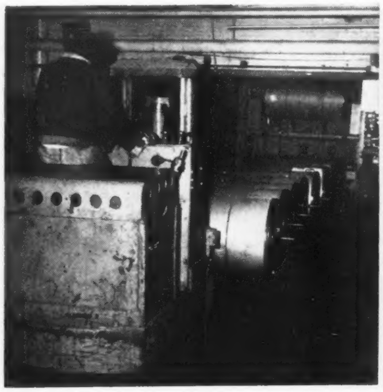


Fig. 2. Six-Story Conveyor Picks up Beams as They Are Pushed out into the Shaftway

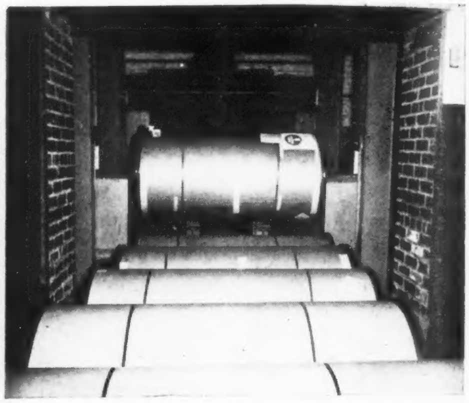
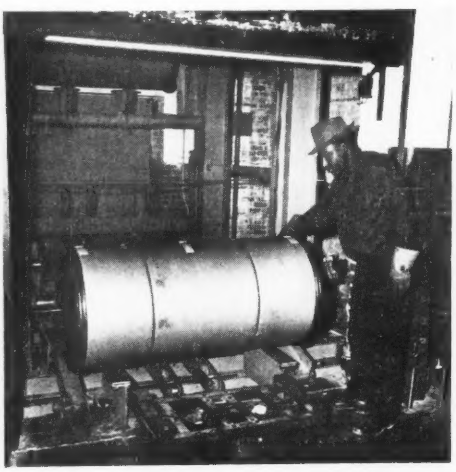


Fig 3. Close up Showing How Tray Picks up Beams; Beam's Axle Is Engaged by V-shaped Channel as Tray Moves Upward

Fig. 1. Schematic Diagram of the New Gifford-Wood "Ferris-Wheel" Conveyor at Firestone's Textiles Division Plant at Gastonia

(Right) **Fig. 4. Beams Are Deposited by Conveyor on "Fingers" Which Stop Beam and Allow Tray to Pass on**



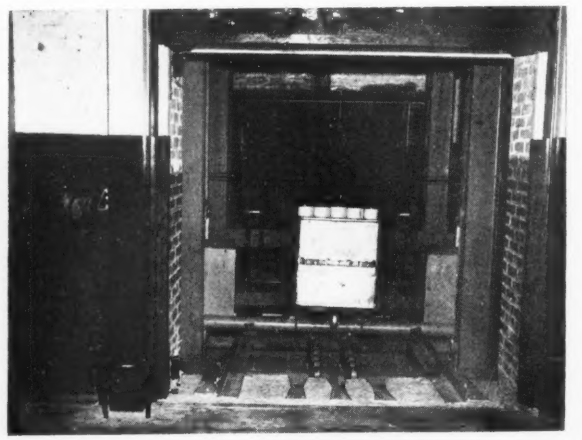


Fig. 5. Box Truck of Spools Are Picked up by Special Platform Built on Tray; Winch at Left Retracts and Extends "Fingers"

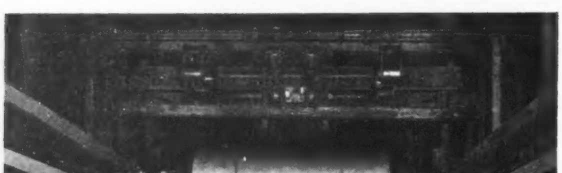


Fig. 6. Conveyor Load of Beams as Seen from Top of Shaftway

A SAVING of about $25,000 annually has been achieved by the textiles division of the Firestone Tire & Rubber Co., Gastonia, N. C., with the installation of a new conveyor, six stories high, for handling beams and box trucks. Up to twice as many beams can be handled daily with this new installation, and freight elevators are freed for other duties.

The system was installed specifically to carry 1,300-pound beams of rayon used in the preparation of tire fabric to the fourth and fifth floors and to return the empties. Existing freight elevators were already operating on heavy schedules, and the beams had to be handled as best they could over the various shifts. About 50 beams a day were handled on this staggered basis; whereas with the new system 80 to 100 beams are handled in one shift.

(Continued on page 781)

Ro-Search, Inc., Foreign Technical Service

L. Leslie[1]

Fig. 1.
Heinz W. Rollman

IN THE cool green hills of western North Carolina lies the nerve center of one of the most unusual and efficient world-wide organizations engaged in spreading industrial "know-how" to more than 30 different countries on all six continents. While firms engaged in the business of spreading industrial knowledge and techniques within a specific industry are by no means new, what makes Ro-Search, Inc., unique is its approach, scope, and relatively small size. Most firms engaged in making "know-how" available to other firms around the world are industrial giants or definitely among the largest in their respective industries. Here, quite the opposite is true. Ro-Search is a small organization which, as a corporate entity, does no manufacturing of the product itself, but licenses its patents and makes available industrial knowledge and techniques to several manufacturing firms that are infinitely larger in size and are industrial leaders within their own countries. However the majority of Ro-Search licensees are medium size or smaller manufacturing plants.

Ro-Search, Inc., of Waynesville, N. C., owns various patents relating to footwear manufacture; primary among these is a method for making various types of footwear embodying the use of chemically blown sponge rubber soles directly vulcanized to footwear uppers of various materials and types.

Titular head of the corporation is Heinz W. Rollman, a man who has had his personal fortunes stolen from him not once, but twice in his life. In 1939, a few hours after Rollman and his wife had boarded a ship to come to the United States to visit the World's Fair then in progress in New York, he heard the news of Germany's invasion of Poland. As was apparent to any man well versed in world affairs, Rollman realized that this was the beginning of another world-wide conflict and decided then and there never to use the return-trip portion of his ticket. He foresaw that what happened to the Rollman family holdings in Germany would be repeated again. The Nazi's confiscatory tactics had deprived them of their holdings in Cologne when their rubber footwear factory was one of the first industries to be "aryanized." Rollman's estimate of the world situation proved to be true, for when Hitler's troops entered Belgium in May, 1940, the Rollmans and their interests in Belgium were near the top of the Nazi "black list."

Formation of Ro-Search, Inc.

After receiving offers from several rubber companies to make available the necessary facilities for setting up a factory to produce this footwear, Rollman selected the picturesque, sleepy little town of Waynesville from among all the rest because he "liked the scenery and the fresh air." Although he formulated his plans for setting up an organization to spread the technical knowledge regarding this process throughout the world, the Second World War intervened and delayed his time-table until 1945. Wellco Shoe Corp. had been set up as the American licensee for the manufacture of the footwear; Ro-Search, Inc., as the organization to pioneer and develop further advances and improvements in the process and to license the patents and disseminate the "know-how" abroad. Ro-Search owns 47% of Wellco.

The first licensing agreement based on this process had been made by Rollman in 1934. By 1935 there was a licensee in every country in Europe. Pirelli, Ltd., in England, which has been producing this type of footwear as early as 1934 under a licensing agreement with Rollman (Rollman manufactured and marked the first pair of "Foamtread" footwear in 1933 in Germany), renewed its prior arrangement and became the first licensee under Ro-Search after the war.

How Ro-Search Agreements Work

All firms in all countries operating under licensing agreements with Ro-Search are locally owned and managed. Ro-Search owns no stock, does not invest in, and has no official voice regarding the internal management or set-up of the licensee firms. Each licensee, however, is perfectly welcome and encouraged to seek all the advice and guidance it wishes in regard to all phases of management, finance, labor relations, styling, merchandising, and sales. When certain materials or equipment is not readily available in the licensee's own domestic market, Ro-Search does, upon request, act as purchasing agent to procure the needed supplies either in the United States or abroad. Remuneration to Ro-Search for the use of its patents and services is based upon royalties on sales of the product.

As has been the experience with most licensing arrangements in other industries, permitting the legal use of patents alone, this cannot be the sole basis of a mutually profitable arrangement. In many cases the transmittal of technical "know-how" is not sufficient either. In several countries that had practically no pool of experienced personnel from which to draw, Ro-Search had to assist in setting up the basic organization. This help meant not only training the workers, but training supervisors, setting up the wage system, the bookkeeping system, and all the other phases of internal management necessary to conduct a manufacturing enterprise. American methods of merchandising and marketing are also recommended, modified to local tastes, psychology, and marketing conditions.

Further evidence of the fact that "patent rights" are not the all-important factors in such working agreements is that some countries have no patent laws, or have patent laws so vague and ineffective that patent right

[1] Director of public relations, Ro-Search, Inc., and Wellco Shoe Corp., Waynesville, N. C.

protection is virtually non-existent. Yet firms in these countries that could proceed to manufacture such items free of any legal complications are still desirous of entering into agreements with Ro-Search (and renewing existing agreements) because they find it infinitely more profitable to do so. Few firms, if any, could afford to undertake the independent research and continual development carried on by Ro-Search. To go to all this expense would be financially impractical if the costs were to be covered by the profits on a single factory's output.

Special Services

Firms affiliated with Ro-Search secure at cost the various machines and special equipment manufactured by Ro-Search. They are continuously supplied with samples of the various types and styles of footwear made by American and other licensees. New improved formulae are sent out as soon as tests have been completed, and special formulae are developed to meet local conditions, such as excessive heat or humidity, or scarcity of particular chemicals.

Each manufacturer regularly sends production samples of the footwear he makes to Waynesville for inspection and recommendations for technical manufacturing improvement, added sales appeal, or simplified manufacturing operations. This phase of the operation was established to encourage the habit of product improvement especially in those countries that have not in the past been faced with competitive merchandising problems, or where local industries had not developed a tradition for product improvement for the benefit of the purchasing public. "Foamtread" manufacturers in these various countries have found this practice exceedingly stimulating, interesting, and profitable. In those countries where the competitive system is strongly entrenched, this service is a necessity for the welfare and continual growth of the manufacturer.

Cooperative Advertising

The same principles of constant improvement are employed with regard to advertising matter. Samples of advertising material produced in America are sent to all licensees, and each manufacturer sends samples of his own promotional efforts to Waynesville for redistribution to other licensees. Suggestions for getting the most out of advertising appropriations are made to each manufacturer. In fact, a central advertising service has been set up in South America to permit the various Latin American licensees to avail themselves of the added economies of group preparation of advertising material. By cooperatively combining their promotional efforts, each manufacturer can afford better artwork, can avail himself of the economies involved in larger printing runs and exchange of merchandising schemes that have proved successful in any one of the countries.

Fig. 2. Various Types of "Foamtread" Footwear Now Being Made All over the World by Ro-Search Licensees

Each licensee is encouraged to use its own ingenuity in developing new techniques. Whenever a licensee develops something new or profitable, full information regarding the new development is automatically forwarded to Ro-Search in Waynesville, and this information is immediately and systematically transmitted to every other licensee. Thus each firm receives not only the benefit of developments pioneered in the American laboratories and factories, but in affiliated ones as well.

Language is no barrier to successful cooperation. All correspondence and transmittal of information is usually conducted in the native tongue of the recipient firm. Correspondence from these firms is almost always received in the native language. Even though Rollman and the other officers of Ro-Search are accomplished linguists, a staff of translating experts is employed in Waynesville to handle the mass of detail of technical translations from one language into another.

Wherever required and requested, technical crews are sent to the licensee manufacturers to train personnel or work out solutions to particular local technical problems within their own factories. In many instances the licensee sends personnel to Waynesville or to neighboring countries for training. Ro-Search also maintains field representatives on the various continents to cope with immediate problems.

Industrial Relations

One of the outstanding advancements in industrial relations that Ro-Search is successfully introducing into various countries around the world is the growing opportunity and importance of women in industry. In that respect Wellco Shoe Corp. furnishes an excellent example. The plant manager, who is also personnel director, is a woman. The assistant to the president of Wellco is also a woman. Women head the order and the shipping departments; many of the plant supervisors and department heads are women. Care is always taken to have the

licensees introduce such ideas slowly and subtly. For it is never sound business policy to run roughshod and high-handedly over existing local social and business customs.

Extent of Ro-Search Agreements

Each manufacturer may advertise and sell "Foamtread" footwear under his own brand names and use his own trade marks, or he may use those owned or controlled by Ro-Search. Each manufacturer is also free to establish his own selling prices, profit mark-up, and sales practices according to the needs and requirements of his home market. Wherever legally possible, the manufacturer receives full patent protection from the patent laws in his own country. Each manufacturer receives exclusive licensee rights within his own country. In the few exceptions to this rule, where two manufacturers operate under Ro-Search agreements, such multiple agreements are made with the full consent of all parties concerned. In each case the dual licensees manufacture non-competing types of footwear.

The only exception to these exceptions exists in the United States. Recently General Shoe Corp. entered into a licensing agreement with Ro-Search and is free to produce the same types of footwear made by Wellco Shoe Corp. Even though General Shoe Corp., one of the four largest shoe manufacturers in the United States, has a daily capacity of 80,000 pairs in 26 plants, its "Foamtread" pairage coupled with Wellco's complete output cannot fully meet the growing demand for this type of footwear in the United States.

"Foamtread" footwear is now being produced in the following countries under agreements with Ro-Search:

Argentina
Cateca, Buenos Aires
Industrias Yuvena S. A., Buenos Aires

Brazil
Sociedade Industrial de Borracha Elastica S. A., Sao Paulo

Ceylon
Elasto Products Co., Bentota

Colombia
Cia. de Productos de Caucho "Grulla" S. A., Medellin

Costa Rica
Artinano Hermanos, San Jose

Finland
Kumiteollisuus O. Y., Tampere

France
Ets. Simon Souillac, Bordeaux

Greece
"Tevika" Ltd., Athens

Guatemala
Incatecu, S. A., Guatemala City

Israel
Hamgaper Ltd., Haifa

Mexico
Distribuidora Industrial S. A., Mexico, D. F.

New Zealand
Marathon Rubber Footwear, Ltd., Christchurch

Philippines
Marcelo Rubber & Latex Products, Inc., Manila

Portugal
Empreza Industrial Repenicado & Bengala, Ltda., Lisbon

Spain
Sociedade Iberica de Gomas y Amiantos, Bilbao

United States
Wellco Shoe Corp., Waynesville, N. C.
General Shoe Corp., Nashville, Tenn.

Venezuela
C. A. V. I. "BENACERRAF," Caracas

Licensees are also located in the following countries: Angola, Canada, England, Holland.

Other countries where Ro-Search licensees will soon begin manufacturing operations are: Belgian Congo, Belgium, Chile, Cuba, Egypt, Mozambique, Nigeria, Pakistan, Trinidad.

The total capacity of all Ro-Search licensees at present is well in excess of 100,000 pairs daily. The factory with the largest capacity for making "Foamtread" footwear at the present time is in England, with a daily capacity of 20,000 pairs; while the smallest is in Costa Rica with a daily capacity of 200 pairs. It is interesting to note that the factory in Israel, a country with a total population of only 1,500,000 has just announced that it plans to produce at least one million pairs this year.

Many of the licensees had never been engaged in footwear manufacture of any type prior to their arrangements with Ro-Search. They were, in the main, engaged in manufacturing rubber articles of various types and saw the tremendous potentialities in expanding the scope of their operations. These prospects seemed especially appealing during periods of rubber shortages because relatively little rubber is consumed in the manufacture of any single pair of shoes, permitting large dollar (or its equivalent) volume in sales on minimum rubber supplies, and the essential nature of the merchandise produced made the procurement of raw materials relatively easy to obtain. In many countries the essential nature of the merchandise has permitted obtaining priorities in the matter of international currency exchange.

The primary feature of "Foamtread" footwear that has earned this merchandise an "essential" rating has been its comparatively low cost of manufacture, with resultant low cost to the public, enabling many hundreds of thousands of persons in relatively poor countries to afford a pair of decent shoes for the first time in their lives. Another feature has been the extreme durability and long wear afforded by "Foamtread" footwear.

"Foamtread" Construction Features

The basic construction feature that makes possible this comfort is the same that is employed in the design of the present-day automobile tire: rubber for flexibility combined with "captive" air to increase the shock-absorbing quality of the rubber. Sandwiched between the soft, flexible leather outsole and insole is a thick layer of cushiony sponge rubber. In fact this midsole is actually two-thirds air and one third rubber. A center core of hair felt acts as a balance stabilizer to keep the sponge from giving a shifting sensation underfoot. This felt core also serves to insulate the foot from the heat of the pavement in summer and to keep out the cold in winter. The same shock-absorbing principle of the combination of air and rubber that enables the present-day inflated tire to give many more miles of wear than would a solid rubber tire, is the secret of the unusually long wear of the "Foamtread" sole. This shock-absorbing quality also makes possible the use of the thinner-than-usual and softer-than-usual outsole leather. By actual wear tests the thinner leather used on "Foamtread" soles will last longer than leathers five or six times as thick on conventionally constructed shoes.

Because the uppers are directly vulcanized to the sole, no wires, nails, or other metal parts are used in the construction of "Foamtread" footwear, allowing for additional flexibility and comfort. This process creates a wa-

Fig. 3. Typical Aluminum Mold Used for Making "Foamtread" Footwear in the Ro-Search Process

terproof bond not possible in conventional shoe construction. "Foamtread" footwear, because of its unique construction, can be washed as easily as a handkerchief without any harm to the shoe or slipper. When tossed into a washing machine, the shoes come out looking like new.

The unique comfort made possible by this type of shoe construction also appealed to many thousands who preferred going barefoot to encasing their feet in the stiffer, crudely fitting shoes of conventional materials available in local markets at the only prices the poor could afford. The appeal of "Foamtread" footwear, however, has not been exclusively among the poor by any means. The fine styling potentiality of the process coupled with the comfort feature has made this footwear popular with persons who could afford even the most expensive shoes made. In countries where mechanical means of transportation are limited, the comfort feature becomes a prime consideration. Even in countries where transportation is no problem, the daily occupations of most persons require that they be on their feet a great deal of the time, and their appreciation of foot comfort is just as apparent.

Information Services

Informational bulletins of interest to the affiliated firms, or in the interests of the respective managements, or in the interest of the employes of these firms, are continually sent out. A typical cross-sectional list of such bulletins picked at random indicates the wide scope and nature of topics covered:

"Advertising Display Card Used by the Affiliate in Colombia."
Information regarding the effectiveness of a particular display card accompanied by a sample of the card itself.

"Venezuela Newspaper Ad."
Facts and figures concerning the pulling power of a particular newspaper advertisement accompanied by a photostat of the ad itself.

"Visits of Sons of Directors of Factories to Other Countries."
This bulletin outlined a recommendation made by one of the directors of the Brazilian affiliate which stated, in part, "It would be feasible for the sons of the owners and directors of Ro-Search factories to spend a few months in various plants all over the world where Ro-Search footwear is manufactured, and that these young men would live with the families of the owners or directors and be treated like one of the family" . . . in the interest of these sons receiving "as broad an education and as wide a knowledge as is possible."

"Sprinkler System for Fire Protection."
Outlining the experience of Wellco Shoe Corp. installing a sprinkler system, the cost of which is paid for by savings on fire insurance premiums within two years.

"Savings."
An explanation of how Wellco instituted certain reductions in waste in wages, materials, and overhead, without impairing the quality of the product, the efficiency of the overall operation, or the income of the employes. In fact, they made possible a sufficient increase in operating profits to the extent that even higher wages could be paid to deserving employes and higher dividends to stockholders.

Other titles that are self-explanatory are:

"Use of Public Address System in Factory for Music and Company News."
"Daily Inspection of Shoes Picked at Random from Stock."
"Sample of New Casual Shoe for Children."
"Periodic Company Progress Informational Report to Employees."
"Birthday and Christmas Gifts for All Employees."
"Better Labor Relations."
"Copy of Speech by Ass't Administrator for Production of E.C.A."
"Company-Paid Health Insurance Policies for All Employees."

Aside from technical bulletins, the majority of all bulletins cites examples of improved labor-management relations as practiced in either the factories of the American licensees or any of the plants abroad. Practically every idea or practice innovated at Wellco becomes the subject of a bulletin to all affiliated companies.

Ro-Search is now in the process of preparing a training film in color showing the various steps and techniques involved in the manufacture of "Foamtread" footwear. Here, too, the film carries through the "human element," showing typical workers and supervisors in their home environment as well as at work in the factory.

The following bulletin, dated February 19, 1952, gives an excellent indication of the growing popularity around the world of entering into "know-how" agreements:

> "Yesterday, February 18th, was one of the outstanding days in the history of Ro-Search. A total of five different factories in five different countries sent in agreements. All wrote that their board of directors decided to start a Ro-Search 'Foamtread' factory. Some of the factories are in South America, others in Europe, and one also in Asia . . . . "

Summary and Conclusions

Any small rubber factory that has a mill and a small calender can start a "Foamtread" shoe factory to make approximately 500 pairs a day with a total capital investment of 10 or 15 thousand dollars, since only a few sewing machines, cutting machines, electrical tables, and special vulcanizing molds are needed.

There are still a billion people in the world who don't have shoes to wear, and Ro-Search proposes to help shoe these people. To this end Ro-Search has made arrangements in its organization to extend the scope of its activities to 40 additional countries, thereby bringing the total number of countries to 70. In each of these 40 countries Ro-Search plans to work with one local company exclusively. Rollman will soon make a trip around the world to visit these countries, especially the countries in Asia and Africa in dire need of more rubber footwear plants which can be started without a tremendous investment of capital.

Further Extracts from Paley Commission Report on Coal and Petroleum Chemicals and Products Made Therefrom—I[1]

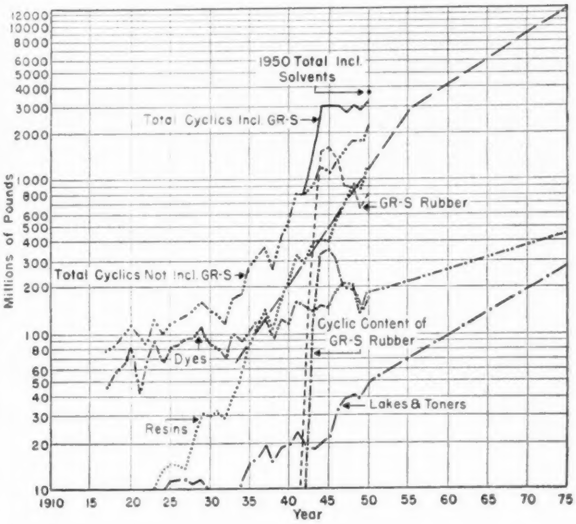


Fig. 1. Production of Some Cyclic Chemical Finished Products

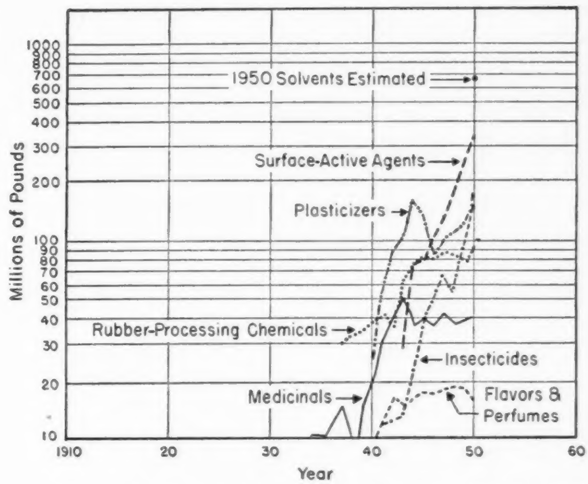


Fig. 2. Production of Additional Cyclic Chemical Finished Products

VOLUME IV of The President's Materials Policy Commission Report,[2] sometimes called the Paley Commission Report after the chairman of the Commission, William S. Paley, who is also chairman of the Columbia Broadcasting System, is entitled "The Promise of Technology." Chapter 12 covers "Coal Products and Chemicals" and was prepared by members of the staff of Koppers Co., Inc., at the request of the Commission. Chapter 13, on the subject of "Oil and Gas as Industrial Raw Materials," is a condensation of a study made for the Commission by Gustav Egloff, of Universal Oil Products. Chapter 14 discusses "Forecasts for Petroleum Chemicals," and this chapter was prepared for the Commission by the Standard Oil Development Co., in cooperation with the chemical products department of Esso Standard Oil Co.

Much information of interest on synthetic rubber, plastics, rubber processing chemicals, etc., is found in the three above-mentioned chapters and is reprinted herewith. All of this material is in addition to that already reprinted in our July issue.

"Coal-Chemical Future"

These pages consider future demands for coal chemicals in the form of finished chemical products, without regard to availability. The term "finished chemical products" means the chemicals in the form prior to their use in or as industrial consumer goods. The finished chemicals consist of cyclic and acyclic products, with few exceptions. Cyclic chemical products are now largely derived from coal. Acyclic chemicals, with some exceptions, are derived from petroleum, natural gas, and agricultural products, but are considered herein for comparative purposes.

Past and Present Trends in Cyclic Finished Products

Figures 1 and 2 show the production record for cyclic finished products, including GR-S rubber. Notable are: (1) the slow, steady rate of increase in production of dyes and color lakes and toners, resulting from expanding use in plastics; (2) the rapid increase in production of medicinals and flavor and perfume materials during the Second World War, and the steady rate of production in the postwar years; (3) the immense production of synthetic rubber (GR-S) brought about by the Second World War, and the decline and recent revival of this production; and its effect on the demand for rubber-processing chemicals; (4) the rapid rise in the production of synthetic insecticides and synthetic detergents of cyclic origin during and since the war; (5) the rapid, steady rise in the production rate of synthetic resins and plastics, mainly the cyclic intermediates (phenol, phthalic anhydride, and styrene) throughout the entire period; (6) the rise in production of cyclic plasticizers during

[1] The President's Materials Policy Commission Report of June 23, 1952. U. S. Government Printing Office, Washington, D. C.

[2] India Rubber World, July, 1952, pp. 501, 504, 518-19.

the Second World War and, following a decline, another rise during the past few years for the cellulose acetate and vinyl plastics.

The production of cyclic chemical products (which we may take to be synonymous with coal or coal-tar chemicals) did not become important in the United States until imports of synthetic dyes and medicinals was cut off by the First World War. Other types of cyclic chemical products were either unknown or nearly so. The First World War created a large demand for phenol for the manufacture of picric acid (trinitrophenol) for military purposes. The large (for that time) capacity created an incentive to the production of phenolic resins, particularly the hard thermosetting resins useful as molded plastics. The glycerol-phthalate resins, now known also as phthalic alkyd resins, were introduced in 1926 and soon attained large usage in paints, enamels, and lacquers, especially in the automotive industry. The thermoplastics, polystyrene and other resins containing styrene were the last of the important cyclic resins to develop. Styrene plastics were a direct result of the Second World War. The capacity for styrene monomer, originally needed to make up 20 to 25% of GR-S type of synthetic rubber, was available after the war to a large extent for production of polystyrene and styrenated resins of various types. The demand for cyclic plasticizers has developed with the plastics and has changed in detail as new plastics have become important. The vinyl plastics, comparatively recent, but now the largest group of plastic materials, require large amounts of plasticizer (30 to 50% of the resin content).

The coumarone-indene resins are thermoplastics and are derived from the light oil of coal carbonization. Production was only about 100 million pounds in 1950, but could be increased since not all coke-oven light oil is treated for these resins at present.

Among the acyclic chemicals are synthetic fibers, such as viscose rayon, cellulose acetate rayon, and nylon. A number of new fibers are in the first stage of commercial development: Orlon (polyacrylonitrile), Dynel (60% vinyl chloride and 40% acrylonitrile copolymerized), and Saran (polyvinylidene chloride). Although these fibers are now made from ethylene, they will, to some extent, be made from acetylene in the future; acetylene or ethylene oxide reacted with hydrogen cyanide can yield acrylonitrile. The only new cyclic synthetic fiber is Dacron, which requires para xylene or other para dialkylated benzene. A comparatively recent development is cyclic surface-active agents, variously called "surfactants" and (according to their end-use) detergents, wetting agents, emulsifiers, or dispersing agents. Production of cyclic surface-active agents has risen rapidly. The largest group is the alkyd benzenoids, which make up over three-fourths of the total production. About 10% of the total cyclic surfactants are derived from phenol. These are known as "non-ionic" surfactants.

The production of organic insecticides in large volumes is likewise comparatively new. Seventy per cent. of production is shared quite equally by DDT and benzene hexachloride, both derived from benzene.

The Growth of Plastics

The uses and potentialities of plastics are well enough recognized in a general way so as not to require specific description herein. Their growth in recent years, as compared with production of competitive materials, is shown in Figure 3. The trend of the industry, as it affects the coal chemicals industry, is shown in Figures 1 and 2.

The 1950 production of plastics obtained from cyclic chemicals as intermediates is as follows:

	Millions of Pounds
Total phenolic and other tar resins (with filler content 55%)	451
Phthalic alkyd resins (practically no filler)	333
Styrene resins	
Polystyrene	261
Other styrene derivative or styrene copolymer resins	94
Coumarone-indene resins (estimated)	100
Total cyclic resins (originating in benzene or naphthalene) (plus coumarone-indenes)	1,239

Current plans anticipate a doubling of production within the next three years. Projection of past growth (Figure 1) will give a total of 80 billion pounds per year at the end of 25 years. Total plastics, now at approximately two billion pounds per year, have increased in the past at almost the same rate (14% per year) and, if projected at this rate to 1975, would give a usage figure of 200 billion pounds per year. Assuming a population of 200 million in 1975, this would require a yearly per capita consumption of 1,000 pounds. Non-industrial usage would amount to 800 pounds per year for a family of four for such semi-durable items as furniture, appliances, and automobiles, and durable items such as window frames, doors, wall panels, piping, electrical fixtures, plumbing fixtures, flooring, roofing, and gutters. Industrial usage is estimated at 60% of the total and will be both durable and non-durable goods.

A Tenfold Increase in Plastics by 1975

In 1951 dollars and at 30¢ per pound, this level of usage would entail a direct consumer expenditure of $240 per year per family, and an indirect expense of $360 per year. It is not believed that even if raw materials are sufficient for free expansion, the purchasing power of the public would be sufficient for such astronomical quantities. Therefore, a projection on a tenfold increase for 25 years has been made for plastics and their related compounds, as follows:

	Millions of Pounds		
	1950	1955	1975
Phenolic (no filler)*	316	650	3,160
Phthalic alkyd	333	560	3,330
Styrene	355	890	3,350
All cyclic plastics	1,284	2,690	12,800

*Molding phenolics have approximately 55% filler as marketed.

The phenolic resins listed would require the following materials:

	1950	1955	1975
Phenol (millions of lbs.)	195	400	1,950
Derived from benzene			
Millions of lbs.	195	400	1,950
Gal.	27	55	276

The phthalic alkyd listed would require the following materials:

	Millions of Pounds		
	1950	1955	1975
Phthalic anhydride	120	200	1,200
Derived from crude naphthalene	335	550	2,310

There is a process for the manufacture of phthalic anhydride from ortho-xylene, but it is difficult to control; with sufficient supplies of naphthalene available, it is believed that naphthalene will be preferred. Ortho-xylene is currently produced from petroleum, although it will be available in the future in quantity from coal processing, if required. The amount now available is 15 to 20 million pounds per year, and one pound produces approximately one pound of phthalic anhydride.

The 1975 projection for plastics and resins containing

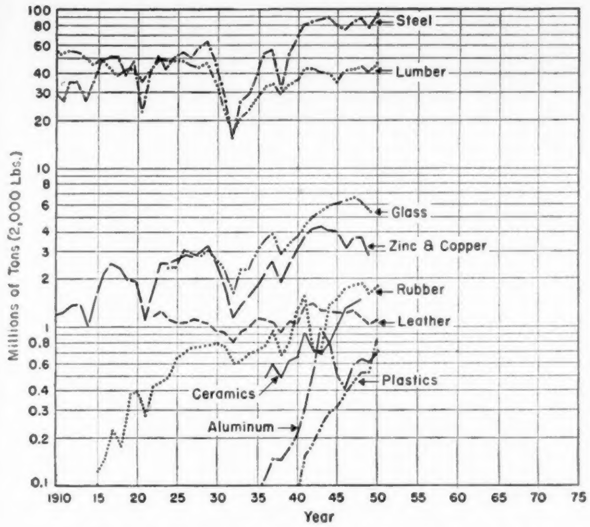


Fig. 3. Production of Plastics vs. Competitive Materials

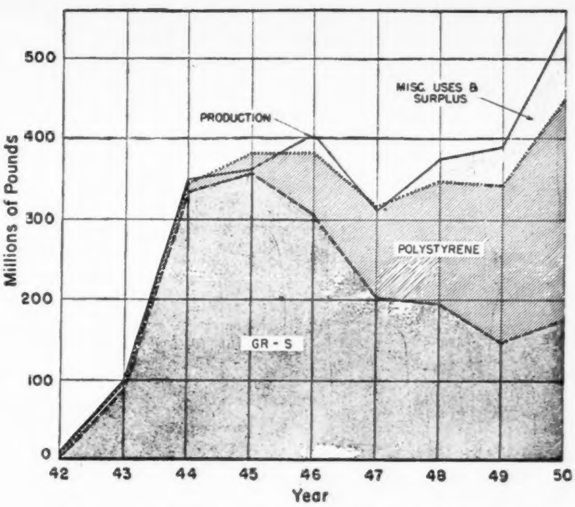


Fig. 4. Production and Consumption of Styrene

styrene is more difficult, since materials of this type were commercially unknown in this country until about 10 years ago. Polystyrene is at present the chief component of such materials. It is the cheapest plastic available, and so, despite its resistance to moderately high temperatures and its low scratch resistance and impact strength, it will continue to be used in large amounts. Improved styrene copolymer resins will find increased usage, despite their higher prices, in place of polystyrene.

The following figures show present and expected consumption and raw material requirements:

	Millions of Pounds		
	1950	1955	1975
Total styrene resins	355	890	3,550
Polystyrene	261	350	715
Styrene copolymer resins*	94	540	2,835
Total styrene required	355	620	2,135
For polystyrene	262	350	715
For styrene copolymers	93	270	1,420
Benzene required	310	539	1,850

*Includes styrene butadiene resins (not elastomers), styrene-acrylonitrile resins, styrenated alkyd resins, and styrene polyester resins.

Non-Resin Cyclic Chemicals Provide Many Products

In addition to the resins, two other classes of materials are also growing rapidly in new uses and by substitution for older materials: (1) synthetic cyclic surface-active agents, and (2) synthetic cyclic insecticides.

Total cyclic surface-active agents for 1950 amounted to 373 million pounds, of which 310 million pounds were derived from coal-chemical sources. The surface-active agents for the household trade, as a replacement for soap, account for about 50% of the total usage at present and are largely of the cyclic type. Unless cheaper new acyclic compounds enter the field, which seems unlikely, we may take the expected increase in this use to come largely from cyclic chemicals, derivable most economically from coal-chemicals processes. This would amount to about a fivefold increase in the present production of synthetic detergents of the alkyl benzenoid type, or 1.2 billion pounds, and would require 230 million pounds of benzene (32 million gallons) and 140 million pounds of toluene (19 million gallons).

Insecticides, fungicides, nematocides, and weed killers are included under the general classification of insecticides. The largest item in 1950 for this class was dichlorodiphenyl trichloroethane (DDT), with a production of 62 million pounds. It is manufactured from chloral and monochlorobenzene, which is made directly from benzene. Benezene hexachloride is also rapidly growing in use in the control of some agrictultural pests; production in 1950 was 57 million pounds.

The principal organic herbicide [2,4-dichlorophenoxyacetic acid (2,4-D)] is of cyclic origin. Control of weeds in pasture land and bush, such as mesquite and secondary growths in timberland, will require increasing amounts of 2,4-D and its esters and salts; a tenfold expansion to about 300 million pounds in 25 years is considered conservative.

In addition to the surface-active agents and the insecticides, there is a variety of other non-resin cyclic chemicals. GR-S rubber, the principal synthetic rubber, is made from a synthetic elastomer derived from a coal chemical. The coal chemical is styrene monomer, 32% of which goes to GR-S rubber and 68% to plastics. Demands for rubber in 25 years are estimated at five times present demand, 85% coming from synthetic rubber. Increase in GR-S rubber will be proportionate to total synthetics, production and requirements beirg as follows:

	1950	1955	1975
GR-S rubber (millions of lbs.)	802	1,900	9,000
Styrene (millions of lbs.)	175	380	1,800
Benzene (millions of gal.)	21	32	226

Only nominal increase in the usage of dyes is expected. Present production of 200 million pounds should increase by 1975 to about 350 million pounds. Color lakes (the colorants for paints, printing inks, rubber, paper, and plastics) will increase more rapidly, largely owing to their use in plastics; present production of 50 million pounds is expected to increase to about 130 million pounds in 1975. Cyclic medicinals have had only a nominal growth, for the trend is toward antibiotics, hormones, and vitamins, which are mainly available from natural sources. Production in 1950 was 39 million pounds, of which half was for the salicylates and acetyl salicylic acid (aspirin) from phenol, an an eighth was for sulfa drugs, derived largely from aniline and pyridine. Production in 1975 will be about 80 million pounds.

Production of cyclic flavoring and perfume agents also will increase only nominally, from 11 million pounds in 1950 to 22 million pounds by 1975. The largest item

is methyl salicylate (synthetic oil of wintergreen), the intermediate for which is phenol. A twofold increase is expected also for cyclic solvents (benzene, toluene, xylenes, solvent naphtha, phenol, cresols, chlorobenzenes, nitrobenzenes, and aniline) in their solvent uses, from 679 million pounds in 1950 to 1,244 million pounds by 1975. The trend in production of cyclic plasticizers is dependent on technological changes in plastics and resins production. Vinyl resins require large amounts of the phthalate plasticizers, which are of the cyclic type. The expected tenfold increase for vinyl resins necessitates a similar increase of phthalate plasticizers, from 143 million pounds in 1950 to 1,430 million pounds in 1975, requiring (in 1975) 830 million pounds of phthalic anhydride.

Approximately a fivefold increase is expected for cyclic rubber processing chemicals, to 450 million pounds in 1975. The expectation is based on expected production of synthetic rubber, which requires larger amounts of rubber chemicals than does natural rubber. The cyclic intermediates used in greater volume are aniline and (to a lesser extent) beta-naphthylamine, the prime chemicals being benzene and naphthalene.

Expected Production and Requirements

The following tables summarize the projected production of cyclic finished products, solvents, and elastomers, for 1975, and for the intermediate chemicals required in making these end products.

CYCLIC FINISHED CHEMICALS

	Millions of Pounds		
	1950	1955	1975
Total cyclic finished products	2,445	4,723	19,590
Dyes	202	232	352
Color lakes and toners	48	65	133
Medicals	39	45	69
Flavor and perfume materials	11	13	21
Resins and plastics	1,284	2,690	12,800
Rubber chemicals	98	117	450
Plasticizers	180	300	1,800
Surfactants	373	936	1,865
Insecticides	210	325	2,100
Cyclic elastomers (GR-S)	802	1,900	9,000
Solvents	679	787	1,244
Total all cyclic end-use chemicals	3,926	7,410	29,834

PHENOL

	Millions of Pounds		
	1950	1955	1975
For phenolic resins	195	400	1,950
Chemicals	70	148	780
Solvent refining	15	18	30
Export	14	14	14
Miscellaneous uses	17	20	32
Total	311	600	2,806

STYRENE (See Figure 4)

	Millions of Pounds		
	1950	1955	1975
For styrene resins	355	620	2,135
GR-S rubber	175	380	1,800
Total	530	1,000	3,935

BENZENE

	1950		1955	1975
	Millions of Gal.	% of Total	Millions of Lbs.	Millions of Lbs.
Phenol	41	21.9	82	385
Styrene	65	34.7	107	476
Aniline	14	7.5	18	27
Nylon	20	10.7	30	30
DDT	5	2.7	7	50
Diphenyls	3	1.6	5	10
Maleic anhydride	3	1.6	5	30
Synthetic detergents	10	5.4	25	50
Dichlorobenzenes	5	2.7	7	10
Monochlorobenzene (other than DDT, phenol, and aniline)	5	2.7	7	10
Nitrobenzene (other than aniline)	4	2.1	6	9
Miscellaneous chemicals and solvents	12	6.4	20	62
Total	187	100.0	*319	1,149

*No account is taken of benzene requirements for aviation gasoline for military purposes which are beyond the scope of this report.

PHTHALIC ANHYDRIDE

	Millions of Pounds		
	1950	1955	1975
Total phthalic anhydride	240	400	2,192
For alkyd resins	120	200	1,200
Phthalate esters	83	138	830
Dyestuffs	15	25	65
Food and drugs	7	12	32
Miscellaneous	15	25	65

The present and projected total production (plus imports) and end-usage of total cresylic acid (crude and refined) and cresols (production plus imports) is shown in the following table:

CRESOL

	Millions of Pounds		
	1950	1955	1975
Total cresols and cresylic acid	90	135	448
For phenolic resins	34	68	340
Plasticizer (tricresyl phosphate)	16	17	21
Ore flotation	10	12	20
Disinfectants	8	9	13
Carbon removal (engine cleaning compounds)	6	7	11
Lubricating oil refining	6	8	16
Lubricating oil additives	5	7	15
Textile processing	2	3	7
Miscellaneous uses in chemicals, medicinals and dyes	3	4	5

The investment costs[3] for the principal intermediates and finished products discussed in this report are estimated as follows in dollars per annual ton:

Phenol from benzene*	400
Phthalic anhydride from naphthalene	310
O-xylene	560
Styrene from benzene	550
Phenolic resins	48
Phthalic alkyd resins	55
Polystyrene	†75
GR-S copolymers	280
Phthalate plasticizers	110

*Average of four processes in curret use.
Not including investment requirements of raw materials plants to be built to supply phenol demands, such as caustic, sulfuric acid, and chlorine plants.
†See footnote[3].

Chemicals from Acetylene

A number of important chemicals are made wholly or in part from acetylene. They are, therefore, coal chemicals, because up to this time all acetylene in this country has been made from coal coke. Acetylene not being a cyclic chemical, however, it is discussed separately. Acetylene will be made to some extent in the future from natural gas and petroleum hydrocarbons, and it is reported that some chemical companies are now installing commercial units for this purpose.

The manufacture of chemicals in 1950 consumed 300 million pounds of acetylene (out of a total of 414 million pounds), requiring 300,000 tons of coke. The picture is too complex for a breakdown by usage for each kind of chemical, but the production of various chemicals involved for 1950 is as follows:

PRODUCTION OF ACETYLENE CHEMICALS

	Millions of Pounds	
	Produced	Estimated Acetylene Usage (If All Made from Acetylene)
Pentaerythritol	25	*6
Acetic acid (100% synthetic)	350	*†230
Anhydride	650	*†‡480
Cellulose acetate	366	....
Vinyl resins	381	§190
Neoprene rubbers	112	70
Acrylo-type rubbers§	27	....
Fibers (capacity by 1951)§	11	....
Trichloroethylene, etc. (estimated)	1,000	220
Total		1,196

*1,240 pounds acetylene per 2,000 pounds acetaldehyde.
†2,200 pounds acetaldehyde per 2,000 pounds acetic acid.
‡2,400 pounds acetaldehyde per 2,000 pounds acetic anhydride.
§Basis that vinyl resins are all polyvinyl chloride.

Processes are in development for making acrylonitrile from acetylene. Acrylonitrile will be used in increasing

[3]*Chem. Eng.* May, 1951, p. 165, except polystyrene, which is estimate of the author of this part of report.

amounts for synthetic fibers, for nitrile type synthetic rubber, and for neoprene-type synthetic rubber.

It appears that only one-fourth of the potential for acetylene in the compounds in the above table is being met. Acetic acid and acetic anhydride are probably made from other sources to a great extent. A further complication is the fact that Canada exports a large amount of acetylene chemicals, especially vinyl resins, to the United States. If one assumes a tenfold increase in the use of acetylene for chemicals by 1975, but that new production up to 1955 is only half from carbide, the other half from hydrocarbons, and that by 1975 only one-third of the total is from carbide, the following projections are shown:

Chemical Acetylene Production

	1950	1955	1975
Total acetylene (millions of lbs.)	300	550	3,000
Acetylene from carbide (millions of lbs.)	300	425	1,000
Calcium carbide usage (millions of lbs.)	935	1,320	3,120
Coke usage (thousands of tons)	300	425	1,000

Conclusions

The chemical industry, and in particular the synthetic organic chemical industry, is increasing at a rate approximately four times that of all industry. Cyclic chemicals have grown at about the same rate as acyclic chemicals. The volume of acyclic chemicals is approximately 1½ times that of cyclic chemicals.

Coal has been the raw material for most cyclic chemicals until recently, when defense programs required additional benzene to come from petroleum operations, despite higher cost. Coal hydrogenation processes will make available a further large supply of aromatic prime chemicals, such a benzene and its homologs, naphthalene, phenol, and cresols. The coal gas-synthesis process will also give large amounts of aromatic and aliphatic hydrocarbons and substantial quantities of oxygenated aliphatic compounds now derived chiefly from petroleum and agricultural sources. Such chemicals as acetic acid, acetaldehyde, and acetone and the higher homologs of each of these will be produced in large amounts from gas-synthesis operations.

Sources of raw materials will govern in the future. The supply of petroleum and natural gas is limited in comparison with coal. The supply of agricultural products is limited as far as cyclic chemicals are concerned; furfural is about the only cyclic chemical of large volume so obtained.

A tenfold increase in the use of cyclic plastics and resins and in insecticides seems reasonable, together with a nominal increase in products in other groups. Increases in synthetic rubber production, in which raw materials from coal, petroleum, and agriculture should participate on a virtually equitable basis, depend on how much natural rubber can be obtained (imported), and on the progress of the automotive industry.

(To be continued)

Six-Story Conveyor

(Continued from page 772)

In addition, the conveyor carries 900-pound box trucks between twisting and weaving rooms.

The conveyor, engineered and manufactured by Gifford-Wood Co., Hudson, N. Y., is installed in a shaft having doorways on two opposite sides. (See Figure 1.) Doors on one side are for loading; those on the other, for unloading. In operation, the conveyor resembles an elongated ferris wheel. Trays pick up loads on one side of the shaft and carry them up over the top and down along the other side to the proper discharge floor. Trays are suspended 25 feet apart between parallel roller chains which travel the length of the shaft. Chain sprockets are driven at the top of the shaft. Of the six floors, the basement, first, fourth, and fifth are served.

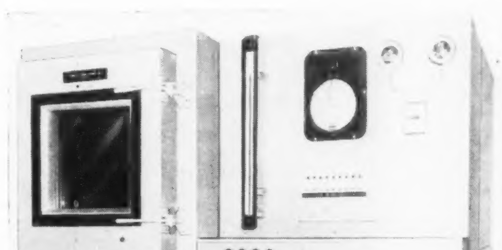
When being loaded (Figure 2), beams are lined up at the door of the conveyor and pushed on to retractable "fingers" extending into the shaftway. A tray picks up the beam and carries it to unloading-floor "fingers" where it is deposited and removed to twisting machines. (See Figure 3.) All other "fingers" are retracted until other floors are to be serviced.

In order for the Gifford-Wood conveyor to operate, one door must be open on the loading side and one must be open on the unloading side. When ready to start unloading, the attendant at the unloading floor pushes a signal button, and the attendant on the basement floor starts the conveyor. Electric-eye controls will stop the conveyor to prevent more than one beam or truck from being deposited at a time. Since the conveyor carries no passengers, most of the insurance and safety regulations for elevators do not apply.

Altitude Test Chambers

A STANDARD line of chambers for use in altitude tests has been announced by Tenney Engineering, Inc., Newark, N. J. Called TenneyZpheres, the chambers provide vacuum conditions simulating altitudes from sea level to approximately 80,000 feet, temperatures ranging from —100 to + 200° F., and relative humidities from 20-95%. Temperature recording controls, pressure controller, and altitude gage or mercury manometer are standard equipment, and all controls are designed for ease of operation and adjustment.

Standard features of the chambers include preset control for any desired altitude; terminal lead-in panel with eight terminal posts and four copper constantan thermocouples; 200-watt heat dissipation at lowest specified temperature; standard instrumentation for wet and dry bulb temperatures; sealed multi-pane viewing window; glareless lighting of the test space; and full access to the chamber interior. Special features can also be obtained when required. While built to meet special-size requirements, the chambers are made in 10 standard sizes ranging from 18-48 inches in width, 22-60 inches in height, and 18-96 inches in depth.



TenneyZphere Chamber for Altitude Tests

Editorials

What Will Be the Future Role of Government to the Rubber Industry?

THIS year and next will see changes of a greater or lesser degree in the Federal Government in Washington because of the national elections on November 4 next. The years 1953 and 1954 will probably see changes also in the extent of the Federal Government's participation in the rubber industry, and there are many reasons to think that more planning should be going on now for the day when the government is really out of the rubber business.

Two agencies at the present time are the main ones involved in the production and control of rubber and rubber products in the United States under the Rubber Act of 1950, as extended on June 30, 1952. They are the new Office of Synthetic Rubber of the Reconstruction Finance Corp. and the Rubber Division of the National Production Authority. The former is responsible for the production, sale, and distribution of GR-S and butyl synthetic rubbers and also for the necessary research and development in connection with these rubbers, about which we will have more to say later. The NPA is concerned with the allocation and control of the use of both natural and synthetic rubbers, when necessary, and also is important in connection with the planning of industrial expansions for rubber products and to a certain extent with expansions for component materials. This agency has been a source of industry statistics on rubber production and consumption.

The General Services Administration is responsible for the natural rubber strategic stockpile, but this job is essentially complete and, except for such procurement as is necessary in connection with stockpile rotation, is a minor factor in governmental activity in the rubber industry.

Import and export statistics on rubber and rubber products have been handled by the Bureau of Census.

The Office of Synthetic Rubber, RFC, will continue to function until April 1, 1954, but the Rubber Act calls for recommendations to the President for disposal of the government owned synthetic rubber plants by March 1, 1953, and also calls for legislative recommendations by the President to Congress on this matter by April 15, 1953.

The NPA, which derives its authority from the Defense Production Act, will go out of existence on April 1, 1953, unless continued by new legislation. Allocation and control of rubber and rubber products will still remain on the books for use, when necessary, until April 1, 1954.

The Federal Government has been in the rubber business for about 10 years, and throughout that period many new services to industry have been provided, but many old services have gradually disappeared. The NPA and its predecessors, as a part of their allocation and control function, accumulated much statistical information on the operation of the rubber industry, and some of this information, such as production and consumption of rubber by industry, has been made available to industry and the public in a regular and improved manner. The Department of Commerce, of which NPA has been a part, formerly provided regular surveys of the rubber industry abroad in its *Foreign Commerce Weekly* and on the domestic industry in other of its publications. These services were abandoned early in 1951.

Through the RFC, the government has sponsored and supported the production, sale, and research on synthetic rubber. The first two functions should, in less than 18 months, become those of private industry, but the future of research, in particular fundamental research on synthetic rubber and on all rubber chemistry and technology, is less clear. The government will probably spend nearly $40 million on rubber research by 1954. When and if all the synthetic rubber plants are sold to private industry, it will continue this research, but since industry will be footing the bill entirely out of its own funds, the emphasis will most likely be on developmental and applied rather than on fundamental research. Synthetic rubber and the rubber industry itself, however, cannot continue to grow without fundamental research.

Plans of various sorts have been suggested from time to time for a central research institute of the rubber industry in this country, but the industry has never been enthusiastic about the idea. Because of the many changes that have taken place in the last ten years, it would seem that some sort of central research institute for fundamental research on rubber would be a must in a year or two. If industry does not provide such facilities, the government probably will, but in the latter case the direction of the research may not always be the way the industry would want it. A continuation of the joint government-industry effort in this field might prove to be desirable.

What we have been trying to point out is that the whole question of the future role of the government to the rubber industry is in need of serious consideration by the industry in order that a majority opinion may be available when the changes take place in 1953 and 1954. There is more than just the problem of the disposal of the synthetic rubber plants; the future of the RFC research program, the extent of business and statistical service to the industry, and what the industry wants from government and *vice versa*, should all be decided sufficiently in advance for best results.

R. G. Seaman

Laurates and Pelargonates of Lactic Esters as Plasticizers for Vinyl Resins

M. L. Fein,[1] E. H. Harris, Jr.,[1] T. J. Dietz,[2] and E. M. Filachione[1]

PLASTICIZERS are a necessary component for the fabrication and use of numerous items manufactured from plastics. The tremendous growth in recent years in the applications of plastics, particularly vinyl chloride resins, has been accompanied by an increasing demand for plasticizers (1)[3]. The demand for plasticizers has exceeded the supply, and critical shortages have been felt (1, 2). Plasticizers currently available, furthermore, do not satisfy in every respect the specifications required in some applications (2, 3). As a result, extensive research for new plasticizers and for new sources of raw materials for this rapidly growing organic chemical industry has been undertaken (4, 5, 6, 7).

The properties desirable in a plasticizer for vinyl chloride resins have been discussed recently (8, 9, 10). The advantages of lactic acid as a raw material for preparing plasticizers were pointed out in an earlier publication from this Laboratory (11). In the past few years, preparation of a number of high-boiling esters of lactic acid of potential value as plasticizers has been reported. Since lactic acid contains both a carboxyl and hydroxyl group, a variety of derivatives containing multiple ester groups can be prepared. Derivatives such as the diethylene glycol bis-carbonates (11), alkyl carbonates (12), adipates, sebacates, phthalates, and maleates (13) of lactic esters and esters of polymeric lactic acid (14) have been prepared and screened as plasticizers, particularly for the 95% vinyl chloride copolymer. Some showed properties as plasticizers which merit interest in this application.

This paper reports the preliminary evaluation of pelargonates and laurates of various lactic esters as plasticizers, and a study of the esterification reaction between butyl lactate and lauric acid as a method of preparation of this type derivative. Esterification with pelargonic acid presumably would be comparable to esterification with lauric acid.

Preparation of Mixed Esters of Lactic and Fatty Acids

The pure ester derivatives of lactic and fatty acids, corresponding to the formula $RCOOCH(CH_3)COOR'$, were prepared by acylating the appropriate lactic ester with a fatty acid chloride, as described previously (15, 16, 17). For purposes of comparison, n-butyl, benzyl, and tetrahydrofurfuryl laurates were also investigated.

Direct Esterification of Lactic Esters with Lauric Acid

Because n-butyl lactate laurate appears to be one of the promising derivatives, its preparation by an esterification process was investigated in detail. Lactic esters, containing a hydroxyl group in addition to the ester group, are capable of direct esterification, as demonstrated in an earlier paper (18). The esterification, however, is not so simple as the esterification of an acid with a simple alcohol. Complications by side reactions such as the self-alcoholysis of the lactic ester (to produce an alcohol and lactyllactate) and subsequent esterification of these side products are encountered. These reactions are illustrated by the equations below. In the esterification reaction all the products corresponding to I-IV in the equations were produced; however, these were readily separable by distillation in vacuum.

$$\underset{\text{LAURIC ACID}}{C_{11}H_{23}COOH} + \underset{\text{BUTYL LACTATE}}{HOCH(CH_3)COOC_4H_9} \overset{H^+}{\rightleftharpoons} \underset{\text{BUTYL LACTATE LAURATE (I)}}{C_{11}H_{23}COOCH(CH_3)COOC_4H_9} + H_2O$$

SIDE REACTIONS:

$$\underset{\text{BUTYL LACTATE}}{HOCH(CH_3)COOC_4H_9} + HOCH(CH_3)COOC_4H_9 \overset{H^+}{\rightleftharpoons} \underset{\text{BUTYL LACTYLLACTATE (II)}}{HOCH(CH_3)COOCH(CH_3)COOC_4H_9} + \underset{\text{BUTANOL}}{C_4H_9OH}$$

$$C_{11}H_{23}COOH + II \overset{H^+}{\rightleftharpoons} \underset{\text{BUTYL LACTYLLACTATE LAURATE (III)}}{C_{11}H_{23}COOCH(CH_3)COOCH(CH_3)COOC_4H_9} + H_2O$$

$$C_{11}H_{23}COOH + C_4H_9OH \overset{H^+}{\rightleftharpoons} \underset{\text{BUTYL LAURATE (IV)}}{C_{11}H_{23}COOC_4H_9} + H_2O$$

The esterification was conducted in the presence of an entraining agent, usually toluene, to remove water from the reaction mixture. A typical example follows: A mixture of butyl lactate (146 grams, 1.0 mole), lauric acid (100 grams, 0.5 mole), toluene (100 milliliters) and p-toluenesulfonic acid monohydrate (1.0 gram) was placed in a flask attached to a modified Dean and Stark tube for collection of the water from the reaction. The mixture was refluxed until the amount of water collected in the trap approached the theoretical quantity. The contents of the flask were agitated by boiling or by means of a magnetic stirrer.

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[2] Present address: Delaware Research & Development Corp., New Castle, Del.

[3] Numbers in parentheses refer to Bibliography items at the end of the article.

In general, the free acid content of the esterification mixture was reduced to approximately 1% (as lauric acid). The catalyst was then neutralized with a slight excess of anhydrous sodium acetate or calcium lactate, and the reaction mixture was distilled in vacuum through a two-foot Vigreux column. The entraining agent was removed at a pressure of approximately 40 millimeters of mercury, and the higher boiling fractions at two to five millimeters of mercury pressure. The products isolated were unreacted butyl lactate (0.46 mole), butyl lactyllactate (0.1 mole), butyl laurate (0.25 mole), butyl lactate laurate (0.23 mole), and distillation residue (11 grams). The distillation residue was principally butyl lactyllactate laurate.

Table 1 summarizes the esterification of n-butyl lactate, sec.-butyl lactate, and capryl lactate with lauric acid. Under the conditions of Experiments 6, 8, and 9 in Table 1, approximately 50% of the lauric acid was converted into butyl lactate laurate. Capryl lactate was more suitable than butyl lactate; 66% of the lauric acid was converted into capryl lactate laurate.

perature to 124-180° C., gave only a 26% yield of butyl lactate laurate. Generally speaking, the ester interchange process was not so satisfactory as the direct esterification process.

Esterification Procedure with Recycling of By-Products

It was evident from the study of the esterification of butyl lactate with lauric acid that a mixture of esters, that is, butyl lactyllactate, butyl laurate, butyl lactate laurate, and butyl lactyllactate laurate, was produced. The latter two are high-boiling esters collected as the last fractions in the distillation. The mixture of these two may be considered a plasticizer. The by-products of the esterification reaction then would be butyl lactyllactate and butyl laurate, which are the most volatile products. These were removed by distillation from the mixture and recycled in the esterification of butyl lactate with lauric acid. The distillation residue is composed of a mixture of butyl lactate laurate and butyl lactyllactate laurate.

TABLE 1. DIRECT ESTERIFICATION OF LACTIC ESTERS WITH LAURIC ACID

Expt. No.	Lactic Ester, Moles	Mole Ratio*	Catalyst, Gram	Entrainer†	Reaction Temp., °C.	Reaction Time, Hrs.	H_2O Ml.	Products, % Conversion: Lactyl-lactate‡	Alkyl Laurate§	Lactate Laurate§
1	n-Butyl lactate, 3.0	3.0	None	Butyl lactate	184–191	13.3	15.5	26	47	26
2	n-Butyl lactate, 3.0	3.0	TSA(¶), 0.1	Butyl lactate	184–196	10.9	17.1	25	52	37
3	n-Butyl lactate, 1.0	2.0	TSA(¶), 1.0	Butyl lactate	205–239	2.4	7.6	22	57	32
4	n-Butyl lactate, 1.0	2.0	TSA(¶), 1.0	Benzene	110–120	5.2	8.4	23	49	40
5	n-Butyl lactate, 1.0	2.0	TSA(¶), 0.1	Toluene	150–153	9.9	ca. 6.0	18	18	38
6	n-Butyl lactate, 1.0	2.0	TSA(¶), 1.0	Toluene	140–150	2.2	9.0	16	47	46
7	n-Butyl lactate, 1.0	2.0	TSA(¶), 4.0	Toluene	130–142	1.0	9.0	22	54	22
8	n-Butyl lactate, 1.0	2.0	H_2SO_4, 0.25	Toluene	148	9.0	7.8	16	32	48
9‖	n-Butyl lactate, 1.0	2.0	TSA, 1.0	Benzene	120–133	5.1	8.6	20	30	52
10‖	n-Butyl lactate, 1.0	2.0	TSA, 1.0	Toluene	146–157	3.0	9.0	26	14	44
11	sec-Butyl lactate, 0.87	1.7	TSA, 1.0	Toluene	140–142	2.5	9.2	15	24	22
12	Capryl lactate, 1.0	2.0	TSA, 1.0	Toluene	141–153	3.5	8.5	..	..	66

*Ratio of lactic ester to lauric acid.
†100 milliliters benzene or toluene were used.
‡Based on lactic ester.
§Based on lauric acid.
¶TSA—p-toluenesulfonic acid monohydrate.
‖In addition, 0.5-mole of butyl laurate was included in the reaction mixture.

Butyl Lactate Laurate by Ester Interchange

In addition to the esterification process described above, butyl lactate laurate may also be prepared by ester interchange from butyl lactate and butyl laurate as shown in the following equation:

$$\underset{\text{BUTYL LACTATE}}{CH_3CHOHCO_2C_4H_9} + \underset{\text{BUTYL LAURATE}}{CH_3(CH_2)_{10}CO_2C_4H_9} \overset{H^+}{\rightleftharpoons} \underset{\text{BUTYL LACTATE LAURATE}}{CH_3(CH_2)_{10}CO_2CH(CH_3)CO_2C_4H_9} + C_4H_9OH$$

As in the direct esterification, this process is also complicated by side reactions; the by-products are essentially derivatives of polymeric lactic acid.

A mixture of n-butyl lactate (0.5 mole), n-butyl laurate (1.0 mole), and 3.0 grams of p-toluenesulfonic acid was refluxed under a Vigreux column; the contents of the flask were stirred by means of a magnetic stirrer. Butanol was distilled from the reaction mixture as formed, and the vapor temperature was maintained at 110-116° C.

In approximately three hours the reaction temperature rose to about 285° C., and the theoretical amount (0.5 mole) of butanol was collected. The ester interchange catalyst was then neutralized by adding a slight excess of calcium lactate or sodium acetate, and the reaction mixture was distilled in vacuum. Sixty-eight per cent. of the butyl laurate and a trace of the butyl lactate were recovered unchanged. The yield of butyl lactate laurate was 48%. An experiment in which the mole ratio of butyl laurate to butyl lactate was 4:1 gave a 60% yield of lactate laurate.

An experiment similar to the above except that the ester interchange was conducted at a pressure of 50 milimeters of mercury, thus reducing the reaction tem-

A series of experiments was conducted according to the general procedure described for butyl lactate laurate. In each experiment, one mole of butyl lactate and 0.5 mole of lauric acid were used, and the ratio of catalyst and entraining agent to the total amount of other reactants was maintained constant. After the esterification was complete, the catalyst was neutralized as before, and the mixture was distilled. Unreacted butyl lactate, boiling at 40° C. at one millimeter of mercury pressure, butyl lactyllactate, boiling at 91-105° C. at 1.2 millimeters of mercury pressure, and butyl laurate, boiling at 115-120° C. at one millimeter of mercury pressure were removed. The residual material was the plasticizer mixture containing the lactate laurate and lactyllactate laurate esters. The butyl lactyllactate and butyl laurate obtained from the run were added to the next esterification batch, and this recycling process was continued through a total of six cycles. The results are tabulated in Table 2.

TABLE 2. ESTERIFICATION OF BUTYL LACTATE WITH LAURIC ACID—RECYCLING EXPERIMENTS

Composition of Reaction Mixture	Cycle 1	2	3	4	5	6
n-Butyl lactate, g.	146	146	146	146	146	146
Lauric acid, g.	100	100	100	100	100	100
n-Butyl laurate, g.	...	76	139	170	222	252
n-Butyl lactyllactate, g.	...	28	40	58	62	49
p-Toluenesulfonic acid, g.	1	1.4	1.70	1.9	2.15	2.22
Toluene, ml.	100	140	170	190	215	222
Conditions						
Temperature, °C.	135-144	137-145	142-145	135-144	142-145	141-145
Time, hrs.	2.5	3.2	2.5	3	3	4
Products recovered						
n-Butyl lactate, g.	46	55	66	53	78	61
n-Butyl laurate, g.	76	139	170	222	252	256
n-Butyl lactyllactate, g.	28	40	58	62	49	63
n-Butyl lactate laurate mixture, g.*	78	96	104	114	115	138

*Recovered as a distillation residue.

Table 3. Pelargonates and Laurates of Lactic Esters as Plasticizers

Plasticizer	B. P. °C.	B. P. Mm. Hg.	Compatibility* Unaged†	Compatibility* Aged‡	Properties of Plasticized VYDR Composition§ Tensile P.S.I	100% Modulus P.S.I.	Elongation %	Brittle Point, °C.
n-Butyl lactate pelargonate	143	3.0	CI	CI	3550	1700	250	−39
n-Butyl lactate laurate	180	4.0	CI	CI	2520	1170	330	−67
Iso-Butyl lactate laurate	179	4.0	CI	CI	2630	1220	280	−51
Sec-Butyl lactate laurate	176	4.0	CI	CI	2920	1270	340	−62
2-Ethylhexyl lactate laurate	207	4.0	I	....	....	....	....	....
Capryl lactate laurate	182	0.8	I	....	....	....	....	....
4-Methyl-2-pentyl lactate laurate	187	4.0	I	....	....	....	....	....
Cyclohexyl lactate laurate	205	4.0	C	CI	3040	1320	350	−42
Benzyl lactate laurate	217	4.0	CI	I	3130	1380	300	−46
2-Ethoxyethyl lactate laurate	193	4.0	I	...	2850	1240	320	−59
2-Butoxyethyl lactate laurate	204	3.2	I	...	2350	1310	240	−44
2-Chloroethoxyethyl lactate pelargonate	183	4.0	CI	I	2990	1110	350	−46
Tetrahydrofurfuryl lactate heptanoate	171	5.4	C	I	2670	910	330	−33
Tetrahydrofurfuryl lactate pelargonate	202	10.0	C	I	2930	1060	340	−32
Tetrahydrofurfuryl lactate laurate	211	4.0	C	I	2780	1110	340	−42
2-(2-Ethoxyethoxy) ethyl lactate laurate	189	1.0	I	...	....	....	....	....
2-(2-Butoxyethoxy) ethyl lactate pelargonate	195	4.0	CI	CI	2560	1110	320	−56
Laurate	229	4.0	I	...	2720	1380	270	....
Ethyl lactyllactate laurate	171	0.9	**C**	**I**	2720	1150	325	−44
n-Butyl lactyllactate laurate	188	1.2	C	I	3090	1400	290	−52
n-Butyl laurate	150	4.0	I	...	....	....	....	....
Benzyl laurate	189	4.0	I	...	3000	1230	320	....
Tetrahydrofurfuryl laurate	178	4.0	C	I	2540	920	320	−58
DOP (control)	228	4.0	C	C	3150	1500	320	−32
Tricresyl phosphate (control)	233	2.0	C	C	3475	2200	280	−5

*C—compatible; I—incompatible; CI—borderline compatibility.
†Molded composition after conditioning at 70° F. for 24 to 48 hours.
‡After several months under room conditions.
§Contained 35% plasticizer.

It can be seen that the yield of the mixture of lactate laurates is considerably improved by recycling the butyl lactyllactate and butyl laurate. Although an absolutely steady state had not been reached in six cycles, it appears that this condition had been approximated by the fourth cycle. The amount of butyl laurate and lactyllactate obtained in the fifth or sixth cycles was approximately equal to the input of these two materials.

The undistilled mixture of lactate laurates can be easily distilled at one millimeter of mercury pressure to give an almost colorless product. Decolorizing carbon was not completely satisfactory for color removal. Esterification in which ion exchange resins: namely, Zeo-Karb H[4] and Permutit Q,[4] were used as catalysts resulted in a lighter-colored product, but the time required for complete esterification was considerably longer.

Analysis by distillation of a typical lactate laurate esterification mixture showed that it contained 63% by weight of butyl lactate laurate, 26% of butyl lactyllactate laurate, and 11% of higher boiling esters of polylactic acid.

Evaluation as Plasticizers

These derivatives were screened as plasticizers for Vinylite VYDR,[4] a 95% vinyl chloride 5% vinyl acetate copolymer. The plasticizer was milled into the resin according to the procedure described in a technical bulletin (19). The formulation used was:

	Parts
Polyvinyl chloride (VYDR)	63.5
Basic lead carbonate	1.0
Stearic acid	0.5
Plasticizer	35.0

The molded sheets (6.0 by 6.0 by 0.08 inches) were conditioned for 24-48 hours at 77° F. and 50% relative humidity. Compatibility was determined by the appearance of the sheet at this stage. Dumbell test specimens with necks 0.125-inch wide and one inch long in the straight portion were die-cut from the molded sheet, and conditioned for one hour at 70° F. and 65% relative humidity. The tensile strength, 100% modulus, and elongation were determined (70° F., 65% relative humidity). A Scott IP-4 tester was used, and the rate of load application was 73 pounds per minute. Specimens, ¼ by 1½ inches, were cut from the molded sheet for determination of the brittle point, as described by other workers (20). After the molded sheets were kept under room conditions for several months, they were also examined for exudation. The results are summarized in Table 3.

Several of the lactate laurates appeared to be compatible upon first examination, but a slight bloom developed on the surface after the sample was several months old. The laurates of the butyl and cyclohexyl lactates appeared to be of borderline compatibility at 35% concentration. One interesting feature of the data of Table 3 is the low brittle points of the compositions plasticized with these lactate laurates, as compared with the control, DOP.

Table 4. Acylated Lactic Ester-DOP Blends (50-50) as Plasticizers

Acylated Lactic Ester	Compatibility* Unaged†	Compatibility* Aged‡	Properties of Plasticized VYDR Composition§ Tensile, P.S.I.	100% Modulus, P.S.I.	Elongation, %	Brittle Point, °C.
n-Butyl lactate laurate	C	CI	2340	1190	160	−44
Sec.-Butyl lactate laurate	C	C	2980	1240	300	−45
2-Ethylhexyl lactate laurate	C	CI	2920	1390	320	−53
Capryl lactate laurate	C	C	2840	1450	230	−55
4-Methyl-2-pentyl lactate laurate	C	C	3050	1370	280	−48
Benzyl lactate laurate	C	C	2990	1180	300	−38
2-Ethoxyethyl lactate laurate	C	CI	2940	1300	320	−41
2-Butoxyethyl lactate laurate	C	CI	3090	1300	330	−46
2-Chloroethoxyethyl lactate pelargonate	C	CI	2980	1180	320	−42
Tetrahydrofurfuryl lactate pelargonate	C	C	3450	1760	290	−30
Laurate	C	CI	2970	1260	350	−38
2-(2-Butoxyethoxy) ethyl lactate pelargonate	C	CI	2520	1170	210	−44
Laurate	CI	I	3040	1340	350	−37
DOP	C	C	3150	1500	320	−32

*C—compatible; I—incompatible; CI—borderline compatibility.
†After conditioning for 24-48 hours.
‡After several months under room conditions.
§Total plasticizer concentration—35%.

Since the lactate laurates do not appear suitable as primary plasticizers, it was of interest to investigate blends of these with common plasticizers such as di-2-ethylhexyl phthalate and tricresyl phosphate. Table 4 shows the data for 50% blends of various lactate laurates with DOP. As expected, the compatibility of the lactate laurates was decidedly improved. Of the DOP blends examined, those containing the laurates of capryl, 4-

[4] Mention of any specific brand names is not to be construed as an endorsement or recommendation by the Department of Agriculture.

methyl-2-pentyl (methyl isobutyl carbinyl), and benzyl lactates appeared to be compatible, and, as judged from the 100% modulus, they were comparable in efficiency with DOP alone. The brittle points of the plasticized compositions containing the blends were 6° to 23° C. lower than the brittle points of DOP, which was the control.

Table 5 shows the results obtained with 50% blends of several lactate laurates with tricresyl phosphate. When blended with tricresyl phosphate, all the lactate laurates examined were compatible at 35% concentration in the plastic. Tricresyl phosphate appeared to be more effective than DOP in compatibilizing these derivatives. As judged by the 100% modulus and brittle point of the compositions, these blends, except those containing the laurates of benzyl lactate and butyl lactyllactate, were approximately equivalent to DOP in plasticizing efficiency.

TABLE 5. LACTATE LAURATE-TRICRESYL PHOSPHATE BLENDS (50-50) AS PLASTICIZERS

	Properties of Plasticized VYDR Composition*			
Lactate Laurate	Tensile, P.S.I.	100% Modulus P.S.I.	Elongation %	Brittle Point, °C.
n-Butyl lactate laurate	3055	1170	335	−41
Sec.-Butyl lactate laurate	3170	1325	290	−42
Iso-Butyl lactate laurate	3105	1370	295	−39
4-Methyl 2-pentyl lactate laurate	3365	1555	280	−40
2-Ethoxyethyl lactate laurate	3200	1330	285	−38
Benzyl lactate laurate	3560	1680	300	−20
Cyclohexyl lactate laurate	3265	1485	305	−27
n-Butyl lactyllactate laurate	3340	1760	265	−11
Controls				
Benzyl laurate + TCP (50-50)	3090	1185	290	−42
Tetrahydrofurfuryl laurate + TCP	3185	1275	230	−34
TCP (tricresyl phosphate)	3475	1945	280	− 5
TCP + DOP (50-50)	3325	1545	290	−22
DOP (dioctyl phthalate)	3200	1320	320	−32

*All plasticizer blends were compatible in both unaged and aged compositions.

plasticizers. When used as blends with dioctyl phthalate or tricresyl phosphate, these derivatives showed desirable plasticizing properties, particularly low-temperature properties. Esterification of butyl lactate with lauric acid was also studied, and conditions were found which produced a mixture of butyl lactate laurate and butyl lactyllactate laurate in high yield. This mixture was in several respects more desirable as a plasticizer than either of the pure components. The lactate laurates may be of interest for use in plasticizer blends with dioctyl phthalate or tricresyl phosphate, particularly for improving the low-temperature properties of these two.

The authors are indebted to W. E. Palm and H. C. Fromuth for assistance in evaluating these materials.

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TABLE 6. BUTYL LACTATE LAURATE MIXTURE AS PLASTICIZER*

		Properties of Plasticized VYDR Composition					
		Compatibility†					
Plasticizer	% by Weight	Unaged	Aged	Tensile, P.S.I.	100% Modulus P.S.I.	Elongation %	Brittle Point, °C.
Butyl lactate laurate mixture*	35	C	‡	2770	1185	400	−53
	30	C	C	3310	1750	290	−45
Butyl lactate laurate mixture + TCP (50-50)	35	C	C	3240	1230	350	−27
DOP (50-50)	35	C	C	2905	1195	400	−40
DOP	35	C	C	3075	1260	390	−30
	30	C	C	3650	2100	275	−27
Tricresyl phosphate	35	C	C	3475	1945	280	−5

*The mixture of butyl lactate laurate and butyl lactyllactate laurate obtained in the recycling esterification of butyl lactate with lauric acid.
†C-compatible. Aged refers to composition after more than four months at room temperature. Unaged refers to composition after conditioning for 24-48 hours.
‡Slight bloom.

Because esterification of butyl lactate with lauric acid produced a mixture of butyl lactate laurate and butyl lactyllactate laurate, this mixture of lactate laurates was investigated as a plasticizer for the vinyl chloride copolymer. The data are summarized in Table 6. This mixture was of borderline compatibility when used alone to the extent 35% by weight of the composition; however, at 30% concentration it appeared entirely compatible.

The composition with 30% plasticizer showed a lower brittle point (—45° C.), but a higher modulus than the control (35% DOP). The 50-50 blend of this mixture with tricresyl phosphate appeared to be equivalent to DOP in plasticizing efficiency; whereas the 50-50 blend of this mixture with DOP was judged to be superior to DOP alone.

Summary and Conclusions

Pelargonates and laurates of various lactic esters were evaluated in respect to their efficiency as plasticizers for the vinyl resins. When used at 35% concentration in the plastic, these derivatives were not suitable as primary

Plastics Survey

(*Continued from page 771*)

certain amount of leather is produced locally; machinery is usually very inadequate. No PVC sheet is made here, but a fairly large amount is imported from England and is hand-printed locally, or hand-painted in gaudy colors.

In general, it was concluded that in the equipment of factories in the above countries the economic conditions of Europe and not of the United States should serve as example; hence for them high-production equipment should mean multi-purpose machinery rather than high-speed single-purpose machines.

On the other hand, Dornbusch, which has just developed a four-color high-capacity printing machine, notes that the need is rather of up-to-date two-color machines, since the former are too expensive for limited operation.

Monsanto's Water Soluble Vinyl Acetate Resin

DEVELOPMENT of a modified water soluble vinyl acetate resin, Polymer C-3, has been announced by Monsanto Chemical Co., plastics division, Springfield, Mass. The new resin was described as "normally insoluble, but becoming soluble on addition of a small amount of alkali or ammonia," by R. C. Evans, general sales manager of the plastics division. Films cast from ammonical solutions of this new resin become water resistant on drying at room temperature.

The resins are unusually stable at elevated temperatures for hot melt adhesive and coating applications where they can be compounded with plasticizers and extenders in the same manner as unmodified polyvinyl acetate.

Polymer C-3 is also an excellent thickening agent and emulsifier for synthetic polymer and copolymer dispersions. Other advantages include its use as a replacement, completely or partially, for polyvinyl alcohol in some applications, as an active surface tension depressant even in hard water, and the fact that the ammonium salt upon drying in air is no longer water soluble. Applications in coatings, adhesives, and as a binder in paints and printing inks were also suggested.

Three viscosity grades, V-10, V-20, and V-30, are available. The low-viscosity V-10 is recommended where rapid solubility of the polymer is required. V-30 is tougher and more heat resistant. The product is manufactured in water-white, bead form. Laboratory and commercial quantities are available from the division.

Chicago SPE-SPI Outing

THE Chicago Section, SPE, and the Midwest Chapter, SPI, held their second joint golf outing of the season on July 25 at the Elmhurst Country Club, Elmhurst, Ill. More than 125 members and guests participated in the golf tournament, which included a dinner, and some 65 prizes were distributed. Warren Cooper, Tennessee Eastman Corp., and Maurice Meltzer, Service Plastics Co., were in charge of arrangements.

SPI Reinforced Plastics Division Elects

HAROLD B. FREEMAN, American Cyanamid Co., has been elected executive chairman of the Reinforced Plastics Division, Society of the Plastics Industry, Inc., 67 W. 44th St., New York 36, N .Y. Other officers elected to represent the division in various sections of the country follow: *East*, Richard Malamphy, Naugatuck Chemical Division, United States Rubber Co.; *Midwest*, R. B. White, Glastic Corp.; and *West*, W. B. Goldsworthy, Industrial Plastics Corp. Members of the Division's executive committee include: (three years) W. B. Wilkins, consultant, R. J. Brinkema, R. J. Brinkema Co., and L. S. Meyer, Western Products, Inc; (two years) Malamphy, White, and Goldsworthy; and (one year) John Avignone, M. A. Cuming Co., Inc., F. I. Bennett, Bakelite Co., and J. A. Owen, Sorg Paper Co.

CALENDAR

Sept.	14-19.	American Chemical Society. National Meeting. Atlantic City, N. J.
Sept.	17.	SAE-ASTM Technical Committee on Automotive Rubber. Rackham Memorial Bldg., Detroit, Mich.
Sept.	19.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Sept.	25.	Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Oct.	3.	Detroit Rubber & Plastics Group, Inc.
Oct.	6-10.	National Hardware Show. Grand Central Palace, New York, N. Y.
Oct.	7.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Oct.	8.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct.	9.	Northern California Rubber Group.
Oct.	11-15.	National Assn. of Waste Material Dealers, Inc. National Fall Meeting. Ambassador Hotel, Los Angeles, Calif.
Oct.	15.	Washington Rubber Group. New York Section, SPE. Hotel Gotham, New York, N.Y.
Oct.	17.	Akron Rubber Group, Cleveland Section, SPE. Vinyl Symposium. Mayflower Hotel, Akron, O. Boston Rubber Group. Hotel Somerset, Boston, Mass.
Oct.	20-24.	NSC. Fortieth National Safety Congress & Exposition. Chicago, Ill.
Oct.	24.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Oct.	28.	Assn. of Consulting Chemists & Chemical Engineers. Annual Symposium. Belmont Plaza Hotel, New York, N. Y.
Oct.	29-31.	Division of Rubber Chemistry, A. C. S. Hotel Statler, Buffalo, N. Y.
Nov.	6-8.	American Assn. of Textile Chemists & Colorists. Annual Meeting. Statler Hotel, Boston, Mass.
Nov.	11-19.	National Foreign Trade Council. Waldorf-Astoria Hotel, New York, N. Y.
Nov.	12-14.	American Council of Commercial Laboratories. Annual Meeting. Schenley Hotel, Pittsburgh, Pa.
Nov.	12.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Nov.	14.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Nov.	19.	New York Section, SPE. Hotel Gotham, New York, N. Y. Washington Rubber Group. American Standards Assn. Annual Meeting. Hotel Waldorf-Astoria, New York, N. Y.
Nov.	21.	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Nov.	25.	Manufacturing Chemists Assn. Semi-Annual Meeting and Winter Conference. Statler Hotel, New York, N. Y.
Dec.	1-6.	National Exposition of Power & Mechanical Engineering. Grand Central Palace, New York, N. Y.
Dec.	4.	Fort Wayne Rubber & Plastics Group. Van Orman Hotel, Fort Wayne, Ind.
Dec.	12.	Detroit Rubber & Plastics Group. Christmas Party.

Acrylic Monomer Price Reductions

AMERICAN MONOMER CORP., Leominster, Mass., has announced price reductions for four acrylic monomers heretofore available only in laboratory quantities. Ethylene glycol dimethacrylate, cyclohexyl methacrylate, and monomer MPL have been reduced to \$2.00 a pound in the technical grade; while butyl acrylate has been reduced to \$1.00 a pound. These monomers are finding increasing use in polyesters, ion exchange polymers, plastic sheeting and molding powder, and similar applications where active cross-linking agents are desired. Butyl acrylate is of particular interest in copolymerization with other acrylates, vinyl acetate, butadiene, acrylonitrile, and other monomers where internal plasticization of a copolymer is desired.

Dimethyl acetamide, hitherto a rare chemical, is now available from the company in commercial quantities at a price of \$2.00 a pound. This chemical is an active solvent for Orlon and nylon and is suggested for use in specialty solvents and adhesives.

Kel-F Vessel Liner

A CHEMICALLY inert vessel liner has been made entirely of Kel-F thermoplastic for use within a fractionating tower handling highly corrosive hydrofluoric acid, according to M. W. Kellogg Co., Jersey City, N. J., manufacturer of the molding powder. Said to be the largest of its kind ever fabricated, the liner was made by Electronic Wave Products, Inc., from extruded film of 0.005-inch thick Kel-F. The film was electronically fused to form the 18-foot long, three-foot diameter closed cylinder. Two layers of film were laminated to give the liner greater strength and provide added protection against damage. All nozzles were also formed from Kel-F film, although a heavier gage was used for this purpose. Since making this liner, Electronic Wave Products has received orders for several more liners, including one for a 75-foot distillation tower.

Vinyl Film Printing Added By Firestone Plastics

A COMPLETE vinyl film printing service was added to the operation of the Firestone Plastics Co., Pottstown, Pa., effective August 1. A full line of stock prints, a variety of surface finishes, and a contract printing department for exclusive designs will be available to the trade. This development puts Firestone in the unique position of being the only company in the vinyl industry offering a fully integrated service, from the raw material through the finished film and sheeting, according to Roger S. Firestone, president, Firestone Plastics.

Firestone formerly confined its film and sheeting production to plain colors, in smooth and embossed finishes; while all film prints were handled by the Hartford Textile Corp., New York. Hartford will continue to handle the retail yard goods

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Scientific and Technical Activities

Symposia to Feature NSC Rubber Section Meeting

THE meeting of the Rubber Section of the National Safety Council to be held as part of the National Safety Congress and Exposition in Chicago, Ill., October 20-24, will feature a symposium, "Lessons from Experience," which will provide means of learning accident prevention techniques through the mistakes of others. Another symposium, "Plant Fires Are Serious—Some Causes and Preventions," will discuss disastrous fires in non-combustible buildings. The sessions will be held in the Sheraton Hotel.

The complete program, which includes a report of activities for the past year and rubber industry safety data for 1951, is given below:

NSC CONGRESS PROGRAM—RUBBER SECTION
Tuesday Afternoon, October 21
Sheraton Hotel—Rooms 817-819

2:00 p.m. **Opening Remarks and Report of Sectional Activities.** George Burkhardt, general chairman, General Tire & Rubber Co.

2:15 p.m. **Rubber Industry Safety Data 1951—Awards and Results—1952 Trends.** F. T. Reynolds, chairman, statistics committee, University of Akron.

2:25 p.m. **Lessons from Experience.**—A Symposium.

1. **Tank Cleaning and Repair.** H. J. Joy, Synthetic Rubber Division, Reconstruction Finance Corp.
2. **Safety Must Be Mental.** Creedin S. Kruger, Carlisle Corp.
3. **Lucky Accidents.** Arthur R. Pomeroy, Ohio Rubber Co.
4. **Fire in the Nitrogen Line.** K. B. Davis, B. F. Goodrich Chemical Co.

3:15 p.m. **Industrial Relations Aspects of Safety.** (Speaker to be announced.)

Wednesday Afternoon, October 22
Sheraton Hotel—Tropical Room

12:00 p.m. **Luncheon.**

2:00 p.m. **Report of Nominating Committee.** R. A. Bullock, chairman, Corduroy Rubber Co.; S. A. Wright, Inland Mfg. Division, General Motors Corp.; H. L. Andrews, Firestone Tire & Rubber Co.

2:15 p.m. **Election of 1952-53 Officers.**

2:30 p.m. **Plant Fires Are Serious—Some Causes and Preventions**—A Symposium.

1. **Combination for Disaster.** Allen L. Cobb, Eastman Kodak Co.
2. **Rubber Plants Will Burn Too! Essentials of Prevention, Education and Rules.** A. L. Brown, Associated Factory Mutual Fire Insurance Cos.

Groups Hold Outings

Golf for New York Group

THE New York Rubber Group golf outing was again held at the Baltusrol Golf Club in Springfield, N. J., on August 5. Members and guests totaling 180 played golf, and 205 attended dinner, at which the prizes were awarded. The committee in charge of this affair was headed by J. Breckley, Titanium Pigments Corp. Other members of the committee were W. S. Rea, United Carbon Co.; E. J. Geise, J. M. Huber Corp.; G. H. Provost, United States Rubber Co.; and H. E. Selby, Bishop Mfg. Co.

Low gross for members and the Nesbit Cup, donated by Jean Nesbit, U. S. Rubber Reclaiming Co., was won by V. Lake, Pioneer Latex & Chemical Co. Runner-up was A. H. Eufer, R. T. Vanderbilt Co., with E. B. Curtis, also of Vanderbilt, third, and F. M. Tolin, Alco Oil & Chemical Corp., and Mr. Breckley tied for fourth place. Low gross for guests was won by J. C. Vincent, with S. Shepherd, second; C. Basilone and C. Anderson tied for third place, and L. Galasso, fourth.

In the putting contest F. Lake and J. Gilbert tied for first place, and E. R. Hanson and V. Lake tied for second place. V. Lake was eliminated as a prize winner in this contest, however, since he had already won the low gross for members. Tied for third place were F. Pechal and I. Kornblum.

In the kickers handicap there were 16 persons tied with a score of 79. Prizes here were drawn by lot.

Even for the high gross score there was a tie, with R. J. McKeefery, Sindar Corp. and C. T. Jansen, *Rubber Age*, receiving golf ball retrievers for their large scores.

Birdies were scored by 20 persons, all of whom received a prize.

Door prizes were won by M. Vaccaro, Witco Chemical Co.; J. S. Guepet, Flintkote Co.; J. T. Kealy, Binney & Smith Co.; and B. W. Carney.

Record Affair for Chicago

THE largest and most successful golf outing in the history of the Chicago Rubber Group took place on July 25 at the St. Andrews Country Club, West Chicago, Ill. Some 210 members and guests competed for the golf prizes; while 300 were present at the dinner concluding the program. Golf and door prizes totaling a record $3,500 in retail value were distributed through contributions received from more than 155 rubber and supplier companies.

J. Adams, Sears, Roebuck & Co., was awarded permanent possession of the United Carbon Trophy donated by Charles Baldwin. The trophy has been awarded annually to the member having the lowest golf score, and this is the third year that Mr. Adams has won. Other first-prize winners in the golf tournament were: low gross, (guests), C. Cattell, Phoenix Mfg. Co.; longest drive, (members), Al Laurence, Phillips Chemical Co., and (guests), H. C. Topel, Reliable Rubber Co.; closest to pin, (members), Walter Heinlein, Bauer & Black Division, Kendall Co., and (guests), Frank McCoy, Armstrong Paint & Varnish Works; high gross, (members), R. Hootman, and, (guests), J. McLaughlin; Peoria system, (members), K. R. Coder, Baldwin Rubber Co., and, (guests), J. Hackett, Chicago Rawhide Mfg. Co. A special attraction at the outing was a "championship foursome," comprising Charles Skuza, Central Rubber & Mfg. Co.; Mr. Adams; Francis Frost, Frost Rubber Works; and Steve Lillis, Victor Gasket & Mfg. Co.

Mr. Laurence headed the committee in charge of arrangements for the outing and was assisted by Bill Lussie, R. T. Vanderbilt Co.; H. Crossland, Sirvene Division, Chicago Rawhide; J. Dunne, C. P. Hall Co.; John Groot, Dryden Rubber Division, Sheller Mfg. Co.; Bob Hartman, Monsanto Chemical Co.; L. Heide, Acadia Synthetic Products Division, Western Felt Works; Earl Mitchell and J. Scanlan, both of Air Reduction Co., Inc.; Frank Smith, Williams-Bowman Rubber Co.; Harold Stark, Dryden Rubber; Ed Wagner, Witco Chemical Co.; and Sid Weller, E. I. du Pont de Nemours & Co., Inc.

Catalog of Infrared Spectra Data

A COMPREHENSIVE punch-card catalog of all available data on the infrared spectra of organic and inorganic compounds is being set up by the National Bureau of Standards, Washington 25, D. C., under the sponsorship of the National Research Council. The catalog also provides a survey of the literature on each compound and abstracts the papers covered. The task of compilation is now well under way, and the first group of data cards on 45 compounds is being made available to laboratories.

Each data card is edge-punched and notched for easy sorting according to four classifications: wave length, melting or boiling point, chemical function group, and number of carbon atoms. For each reference in the bibliography there is an abstract card which can be sorted by reference number, year of publication, subject classification, or apparatus classification. In addition to the cards the NBS plans to print the spectra and bibliographic data that appears on the compound cards on 8½- by 11-inch paper. Special cards will also be supplied for those who wish to use IBM sorting and filing systems.

The price of the data will be the same, whether printed on paper or keysort cards, and will be sold on a subscription basis. It is estimated that the complete cost of the service to the subscriber, exclusive of sorting and filing equipment, will be $200-250 during the first year of operation. Detailed instructions for ordering the cards may be obtained from E. Carroll Creitz of the NBS.

New Standard on Foam Mattresses

A NEW Commercial Standard CS182-51, Latex Foam Mattresses for Hospitals, has been issued by the Commodity Standards Division, United States Department of Commerce. The standard gives minimum requirements and methods of testing for one grade of mattress made of either natural or synthetic rubber latex. The new standard is aimed at providing a nationally recognized specification for the guidance of producers, distributors, and

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NEWS of the MONTH

The Working Party of the International Rubber Study Group that met in London during August to consider a commodity agreement to stabilize the rubber market recessed on August 18 without coming to any agreement, but plans another meeting in December. Continuing British shipments of rubber to Russia were criticized in this country, but were explained as only nominal and for civilian use only. The plan for handling the United States stockpile rotation and replacement program was developing satisfactorily and should be announced during September.

The Reconstruction Finance Corp. explained its $6.5-million research and development program for the fiscal year ending June 30, 1953, with somewhat more than the usual amount of detail. Achievements with oil-masterbatched GR-S, "Alfin" catalysts, and the Nitrazole CF catalyst, which provides an improved GR-S at the regular 122° F. polymerization temperature, were highlighted.

E. Dorrance Kelly was appointed director of the new Office of Synthetic Rubber. Leland E. Spencer, the former director, will remain as consultant until his return to private industry. The output of oil and oil-black GR-S masterbatches is scheduled to increase considerably through September.

A non-tire rubber products expansion program with a $80-million ceiling, of which $37 million has already been approved since March, was announced by the Defense Production Administration. Nylon tire cord expansion programs to double the capacity for this material by 1955 were also announced, as were expansion plans for benzene for styrene and other uses.

John L. Collyer, president of The B. F. Goodrich Co., analyzed cartels and their consequences in another rubber study and found no reason for them to be reestablished. At the same time he again urged sale or lease to private industry of the government-owned synthetic rubber plants, a selling price for government-produced synthetic rubbers to reflect all costs, and the issuance of a statement of policy to producers and consumers of rubber that the strategic stockpile of natural rubber now owned by the U. S. will not be used to manipulate rubber prices. He also suggested means of improving natural rubber production and the standard of living in the Far East rubber areas.

The Rubber Manufacturers Association, Inc., announced further details of the "Natural Rubber Quality and Purchasing Seminars," to be held in several major rubber centers across the nation beginning September 15. These two-day meetings are being planned to help all rubber goods manufacturers get acquainted with the most effective and efficient methods of purchasing and inspecting natural rubber.

Goodyear, Firestone, and U. S. Rubber of the Big Four companies and General Tire, Seiberling, Kelly-Springfield, and Gates granted 10¢-an-hour wage increases to their URWA union employes during August. The increase, at least in part, requires approval of the Wage Stabilization Board. A similar increase was granted Goodrich employes, but disagreement over working conditions resulted in a strike at this company's plants August 18. Late in the month an agreement was reported.

Washington Report by Arthur J. Kraft

Study Group Committee Recesses without Agreement; Shipments to Russia Criticized

The 20 nations represented at the London conference to discuss the possibility of drawing up a commodity agreement to stabilize the rubber market recessed on August 18, apparently without accomplishing much. The meeting of this Working Party of the International Rubber Study Group opened July 30, with the United States, along with other consuming or producing nations, also represented. The Working Party is expected to meet again in December in London to continue discussions, using the interim for consideration by the individual governments of the various proposals brought up at the August meeting and any other ideas they may have. The next meeting will be used to see if any agreement can be reached on some commodity scheme. If so, a detailed plan will be drafted by the Working Party for submission to their governments and later to the IRSG, at next spring's annual meeting in Oslo, Norway.

The Working Party issued the following press release, quoted in entirety, on August 18:

"The Working Party established by the International Rubber Study Group at its meeting in Ottawa has been meeting in London and has concluded its preliminary examination of the problems of the rubber industry covered by its terms of reference: 'to consider whether measures designed to prevent burdensome surpluses or serious shortages of rubber are necessary and practicable; to prepare drafts of any agreements required to implement such measures; and to report back to the Study Group as soon as possible.'

"The question of possible surpluses or shortages was reviewed, and various types of international arrangements which might be applicable to rubber were examined.

"The Working Party will meet again probably towards the end of this year, to carry out a further examination of these problems and proposals when delegates have had an opportunity to consider them further."

No further amplification of this statement was available in Washington toward the end of August. The chief American delegate, Willis Armstrong, of the State Department, was expected back in Washington late last month. George Alexander, also of the State Department, attended the conference as a delegate. Attending as an observer was Morton E. Yohalem, the special assistant to the RFC Administrator, who has been assigned the task of drafting recommendations for disposing of the synthetic rubber plants.

We are indebted, therefore, to the *Financial Times* of London for the following information on the recent London meeting. On August 19 that paper carried a news story stating that two main proposals were examined by the Working Party, giving as its source a Whitehall spokesman. The proposals were:

1. An arrangement covering multi-lateral contracts between producers and consumers plus a buffer stock. The multi-lateral contracts would provide that consumers buy a certain amount of rubber, which the producers would agree to provide.
2. Establishment of a buffer stock on its own.

The Whitehall spokesman said that both proposals have given rise to a great number of technical and other questions, which will require considerable greater study than was possible at this preliminary conference in order to determine if either offer promises a solution to "the rubber position." Judging from the sentiments voiced at Ottawa, these proposals probably came from the Indonesian or Indo-China delegates, since they were the chief proponents of a commodity agreement. The British and Malayanas are believed to regard the task as close to insurmountable, although probably desirable. The American position, as represented by the State Department, is that a commodity agreement of the sort envisioned by the producers is both undesirable and probably impossible to achieve.

The American delegation went to London without any proposal to make, but simply to listen and comment on whatever proposals were advanced by others. The London *Financial Times* commented editorially, in looking forward to the period between the August and December conferences, that "U. K. as well as the producing countries will welcome the attitude of cooperation on the part of the Americans which is perhaps discernible underneath this decision"—the decision to consider the proposals made at London and to meet again to see "whether the remedy lies here or elsewhere."

The Working Party, according to that paper's news account, accepted at the beginning of its talks that there would be a surplus of 275,000 tons of natural and synthetic rubber this year. It recognized that for the moment this balance was being absorbed by government stockpiling, mainly by the U. S., but that such purchases must at some time come to an end. It agreed also that surpluses would yield eventually to shortages, but did not feel that it could name a date when a general shortage situation would supersede the current surplus situation. Most estimates put that date at 1960.

The decision to look further into the possibilities of some sort of commodity agreement for rubber was hailed by the London *Financial Times* as a "concrete

approach and . . . . therefore a step forward." It commented further that "many difficulties" stand in the way.

"An international commodity agreement on rubber," the paper said editorially, "could be fraught with as many difficulties as any other commodity agreement of the past. It is, of course, easy enough to understand that arrangements of the sort which the Working Party had in mind would be welcome to the British Treasury. To the Malayan Government, struggling under the economic burden of an expensive war, a scheme which would guarantee rubber purchases by the U. S. would also be attractive, while producers would in some ways benefit from assured markets. But the problem cannot be assessed only in these simple terms. In the long run it is far from certain that centralized buying would cure the rubber industry. A sound international market is vital to the health of an industry like rubber, and under the sort of arrangements that are being considered the true market price might well be undermined. The example of other commodities that have been under Government control, which have suffered from price uncertainty and violent price fluctuations, shows the danger in which rubber might lie. To many it will still seem that the real difficulty is the competition of over-favored synthetic rubber. If the U. S. would cooperate so that synthetic and natural rubber could compete on equal terms, then a real advance would have been made."

By "over-favored synthetic rubber" the British journal is referring to the alleged price subsidy being conferred on synthetic rubber by government operation of the GR-S plants here, that is, RFC's policy of selling GR-S at cost. The producers share the belief of many here that the price of synthetic rubber would rise several cents a pound were the plants in private hands.

Apparently they are willing to discount as of small significance that RFC—without deviating from its policy—expects to turn in a profit of about $25 million this year on total sales of about $300 million of synthetic rubber.

NAITD Condemns Rubber to Red Bloc

A halt in shipments of natural rubber to the Soviet Union and Communist China by America's allies was demanded last month by C. L. Pangborn, president of the National Association of Independent Tire Dealers, in a statement released by its Washington office August 20.

Mr. Pangborn, an Ottumwa Iowa, manufacturer (industrial rubber-tired wheels) and dealer, called the shipment of 82,250 tons of natural rubber to Russia and Red China in the first six months of this year "shocking news." The tonnage had been announced a few days earlier through a Department of Commerce press release, giving preliminary estimates on worldwide rubber production, consumption, and stocks as drawn up by the Secretariat of the International Rubber Study Group.

The tire dealer official compared shipments of natural rubber to the Soviet bloc to the shipments of American steel scrap to Japan prior to Pearl Harbor, steel that was converted into war weapons. He called up "every tire dealer in this country and those people engaged in the rubber industry to support action which will halt these rubber shipments."

Mr. Pangborn said he found "particularly disturbing the fact that an ally such as Great Britain should be the prime supplier for the Soviets with a total of 59,066 tons shipped during the six months period."

The Commerce Department press release pointed out that imports by Russia and Red China actually had declined as compared with the first half of 1951, when imports were estimated at 96,250 tons. In both years these shipments accounted for about 12% of world consumption for the period.

British and Malayan shipments to Russia were put under annual quota in May, 1951, and the quota, estimated as between 75,000 and 85,000 tons, is believed adequate to meet normal civilian needs only and does not permit stockpiling. Britain, in accordance with a United Nations resolution banning aid to the enemy in Korea, completely banned all shipments to Red China at the same time. Malaya had shipped about 40,000 tons to Russia and Red China in 1951 (17,500 to Russia and 22,500 to China); while in the first seven months of 1952 Russia got about 11,000 tons from Malaya, but China none.

The shipment of nearly 60,000 tons from Britain in the first half of this year includes 15,000 tons carried over from late 1951, which were unable to move off the congested docks until early this year. The government has assured Parliament in recent weeks that the present annual quota will be strictly enforced and will not be increased. After excluding the 15,000-ton carryover, it is obvious that more than half the quota had gone out before July; so shipments in the latter half of this year will be smaller.

The balance of the shipments to Red China have come chiefly from Ceylon, independently governed and beyond the reach of either British or American influence. Ceylon has resisted American and British pleas to embargo or curtail shipments of rubber to the Communist area. The Ceylonese, through left- and right-wing regimes, have stood fast on their position which has amounted, pretty much, to an insistence that the United States should guarantee the purchase of all Ceylon rubber if it wants Ceylon to stop shipping to the Communists.

Britain is shipping to Russia in exchange for Russian timber and coarse-grain wood, a policy which has the reluctant support of our State Department. The latter has concurred with the British policy of confining the amount of exports to meet only civilian needs in Russia and is reputed to feel also that natural rubber is not a primary strategic material, since it must be processed to make it usable militarily. A complete embargo, with the current rather plentiful supply of natural rubber, it is felt would breed resentment of the Western Allies in Southeast Asia, where for many months the idea that America is out to break their rubber and tin markets has been gaining ground. This impression was fostered by some of the statements of Congressional committees and occasional statements of some industry leaders more than by the specific actions of government agencies in helping to bring about lower prices for these materials.

GSA Rotation Plan Progress

General Services Administration officials said toward late August that discussions with the dealer trade and manufacturers on procedures for handling the government's natural rubber stockpile rotation program were progressing to a satisfactory conclusion and may be completely finalized early in September. The discussion began late in July with the purpose of bringing forth and then reconciling the opinions and differences among the three parties concerned—the government, the manufacturers, and the trade.

GSA launched the discussions after sending identical letters to 22 of the larger rubber goods manufacturers and the Rubber Trade Association of New York seeking their comments on how the program should be set up. It asked them to comment on the specific suggestion that manufacturers be permitted to deal directly with GSA in buying rubber from rotation stocks and in replacing that rubber. This suggestion was intended for those manufacturers with buying agents overseas, since they alone are equipped to by-pass the dealer trade in the purchase of rubber to replace that bought from the stockpile.

Agency officials said that some of these manufacturers, in responding to the letter, indicated that they were "interested" in dealing directly with GSA. As reported earlier, those lacking overseas purchasing agents had informed GSA they could not do so. Whether the suggestion of direct dealing between certain manufacturers and GSA will survive as part of the new rotation program (prior to the exclusive buying era, which ended June 30, the rotation program was handled through dealers entirely) depends largely on reconciling the initial opposition of the trade. The dealers make their money on handling commissions. Direct dealing between GSA and manufacturers in the purchase from and the replacement sale to the government would lose two potential commissions for the dealers.

It should be noted, however, that the dealer trade had earned a commission on most of the rubber which will be rotated out of the stockpile. The trade was utilized fully for handling rubber imported for the stockpile, as well as that channeled to consumers, during the 18-month period in which the government served as exclusive importer of crude natural rubber.

1953 RFC Research Program Announced; Kelly New Rubber Division Head

Administrator Harry A. McDonald announced on July 28 that the Reconstruction Finance Corp. has approved a $6.5-million research and development program on synthetic rubber for the fiscal year ending June 30, 1953. This program is a continuation of the work that has been carried out in the past and which has already cost more than 30 million dollars, as authorized by Congress, to maintain a technologically advanced and rapidly expandable domestic rubber producing industry adequate for national defense and essential civilian requirements.

During this fiscal year emphasis will be on improving the quality of synthetic rubber for more extensive use in large-size tires, on improving the quality of cold rubber latex, and on assisting national defense groups in their search for improved synthetic rubber for special purposes. Fundamental research at uni-

versities and elsewhere in the program originates and clarifies scientific ideas for new polymers, which are developed in industrial and government pilot plants, tested in evaluation laboratories and on the Government Tire Test Fleet, and introduced into commercial production. RFC research and development is integrated with synthetic rubber production activities and is constantly made aware of the consuming industry's requirements, which policy assures a helpful practical review and guidance for the program.

The current research program will be conducted for RFC by eight industrial organizations operating GR-S production plants, by the Government Laboratories operated by the University of Akron, by a Government Tire Test Fleet at San Antonio, Tex., by the National Bureau of Standards, and by ten universities, institutes, and other research organizations.

The industrial organizations participating in the program are the Copolymer Corp., Firestone Tire & Rubber Co., General Tire & Rubber Co., B. F. Goodrich Chemical Co., Goodyear Synthetic Rubber Corp., Kentucky Synthetic Rubber Corp., Phillips Petroleum Co., and United States Rubber Co.

The universities, institutes, and other organizations cooperating in the research are the University of Akron, Burke Research Co., Case Institute of Technology, University of Chicago, Cornell University, University of Delaware, University of Illinois, Massachusetts Institute of Technology, Mellon Institute, and University of Minnesota.

The best known product of the research to date has been cold rubber (LTP GR-S), which can be compounded into tires to give tread wear considerably better than that from natural rubber. The most important recent product of the program is oil-masterbatched GR-S, which provides a final product of normal viscosity, but which has been extended with rubber processing oil without detriment, but rather with benefit to its physical properties.

During the past year the following were among the most noteworthy accomplishments of the research program:

1. Oil-masterbatched GR-S was developed to the point where it has become an established production item because of a demonstrated 10-20% improvement in tread wear performance over LTP GR-S at a substantial reduction in tire cost. This product also provides an expansion in apparent rubber supply with a minimum expenditure of raw materials and equipment.

2. The development of a process using the so-called "Alfin" catalyst originated at MIT. The process was successfully carried out on a continuous pilot-plant scale in the government laboratories, and substantial quantities of high molecular weight Alfin polymers were prepared for evaluation in tires and other essential products. Experts point out that Alfin polymers offer interesting possibilities because they are extremely tough and yet are free from the degradation constituent known as "gel."

3. A type of GR-S approaching cold rubber in physical properties, but which can be produced in non-refrigerated equipment, was developed. The new GR-S is made at 122°F. rather than at the LTP GR-S temperature of 41° F. Improved properties for the rubber made at the higher temperature are achieved by the use of a new reaction system employing an aromatic nitrogen (diazo) compound, Nitrazole CF, as the catalyst. Pilot-plant quantities of the new GR-S prepared early in 1951 showed promising results in road tests on the Government Tire Test Fleet. During late 1951 an experimental commercial run of the product was made in the RFC synthetic rubber plant at Akron, O., operated by Firestone. Tests of the new rubber on the Government Fleet totaling 600,000 tire miles, together with results reported on private tests, lead to the conclusion that it is definitely better for tread wear than 122° F. GR-S, and possibly equal to LTP GR-S. The new GR-S apparently obtains its improved properties by virtue of superior molecular weight distribution achieved by the new catalytic system rather than low temperature polymerization. This development increases the productive flexibility of the synthetic plants, because if full consumer acceptance of the new rubber is obtained on such matters as processibility, the capacity of the plants manufacturing 122° F. GR-S can be directed to the manufacture of an improved product. Experts believe it possible that further research and development may enable the new type of polymerization to be utilized for the production of synthetic rubber in cold-rubber plant equipment so that a product even better than the present cold rubber may eventually be realized.

The results of research from all participants in the program are published as rapidly as they can be technically edited. During the past year 94 articles were published in scientific and technical magazines. A new and better classified list of articles published of interest to workers in the synthetic rubber field will soon be available from RFC.

RFC formulates the overall research program each year and with the aid of inter-related committees develops detailed plans, maintains a balance among the fundamental, applied, and developmental research work, and facilitates a continuous exchange of research findings. The general objectives are to make synthetic rubber better and cheaper and to produce it more efficiently.

Kelly Replaces Spencer at RFC

E. Dorrance Kelly was appointed August 20 director of the new Office of Synthetic Rubber in the RFC. Mr. Kelly, a native of Silver Spring, Md., had been director of the rubber division of the National Production Authority since November, 1951.

Taking over the top command of RFC's synthetic rubber operations, Kelly is succeeding Leland E. Spencer in a high government rubber post for the second time in nine months. Spencer had been director of NPA's rubber division until he moved over to RFC on November 26, 1951, where the rubbber operation was reorganized into the Synthetic Rubber Division of the RFC's Office of Production.

The new Office of Synthetic Rubber in RFC replaced, on August 21, the former Office of Production, which also engaged in tin and abaca fiber operations.

RFC announced that Spencer, who came to government service from his post as vice president of Kelly-Springfield Tire Co., a Goodyear subsidiary, will remain with RFC as a consultant until his return to private industry at an unspecified date.

J. Ernest Miller, a consultant with the RFC Synthetic Rubber Division, was named deputy director of the Office of Synthetic Rubber coincident with Kelly's appointment.

Walter Krappe is expected to succeed Kelly to the top NPA rubber post, and Lawrence B. Doyle is expected to be named deputy director. Krappe joined the division as a special assistant to Spencer and has served as acting deputy to Kelly in recent months.

RFC Rubber Output and Sales

Increasing proportions of the GR-S facilities are being devoted to producing oil and oil-black masterbatches. This fact is indicated by the production and sales figures for the third quarter of 1952.

July sales of GR-S, as reported by RFC, amounted to 50,099.4 long tons, including 23,764.8 tons of cold rubber. Black masterbatch totaled 9,978.5 tons; oil masterbatch, 3,333.5 tons; and oil-black masterbatch 556.6 tons.

August production schedules probably will not be met in full, as a result of a strike which shut down the Firestone operated plant at Lake Charles, La., on August 20. The figures for probable August output which follow are based on the assumption that the Lake Charles plant, one of the largest, which produces regular GR-S only, was not able to resume production during August. August output is estimated, pending final figures, at 47,000 tons, including 24,000 tons of cold rubber. Black masterbatch is estimated at 11,000 tons; oil masterbatch, 4,000 tons; and oil-black masterbatch, 1,500 tons.

Scheduled for September is a production of 50,000 tons of GR-S including 24,977 tons of cold rubber. Black masterbatch is set for 11,668 tons; oil masterbatch, 5,174 tons; and oil-black masterbatch, 1,652 tons. Going from July to September, the figures indicate an approximate 15% increase in black masterbatch, a 50% increase in oil masterbatch, and a trebling of the production of oil-black masterbatch. Total GR-S output, on the other hand, remains stationary over the three months, after discounting the strike losses of August.

July sales of GR-S latex amounted to 2,547.1 tons; while output in August is expected to total 3,200 tons, and the September schedule calls for 3,617 tons. Sales of butyl rubber in July were 4,654.7 tons; while August output is expected to reach 6,200 tons, and the September schedule calls for 5,500 tons.

Non-Tire, Tire Cord, and Chemical Expansion Program

The Defense Production Administration on August 18 announced an "interim" expansion program for miscellaneous rubbers and rubber products, setting a ceiling of \$80 million in new or additions to existing production facilities and equipment. The program with its \$80 million ceiling received its final approval at the DPA in March, but no one has offered an explanation yet why its announcement was held up five months.

DPA stated that tax amortization certificates have been issued for \$37 million. The \$80-million ceiling was selected by DPA as representing the cost of new facilities necessary to keep capacity for these miscellaneous items in step with the expansion slated under previously set goals for the tire industry, but it was indicated that the \$80-million ceiling might

not be reached. New applications for tax amortization certificates in addition to the $37 million already approved will be analyzed on individual merit and approved only if they represent a real and needed addition to the program.

The new program covers nearly all rubber end items not covered by two separate programs announced in February for horizontal wire braided hose and for aircraft, truck, bus, implement and tractor tires. Included in the program are special-purpose synthetic rubbers (excluding butyl), reclaimed rubber, bogie wheels, supports, tank track blocs and bushings, fuel cells, military footwear, gas masks, hard rubber battery boxes and parts, proofed rubber goods, pontoons, life-saving equipment, aircraft and military vehicle parts, and other mechanical rubber goods for defense.

The overall goal for which rapid tax amortization privileges will be extended for the type of tires specified above is 60,000 units a day by January 1, 1955, as compared with the 37,500 units a day capacity existing on January 1, 1950.

Tire Cord Output Up

The Census Bureau reported in August that 1951 saw a record 603,913,000-pound production of tire cord and fabric, an increase of 80.6 million pounds over the 1950 figure. Output of rayon and nylon reached a new high of 314,753,000 pounds, only 36 million pounds shy of equalling the highest annual cotton tire cord and fabric total—the 351 million pounds produced in 1947.

While rayon and nylon tire cord and fabric output continued its steady, year-by-year rise, increasing from 296,983,000 in 1950, cotton tire cord and fabric obtained a relatively larger share of the record 1951 market, rising from 226,050,000 pounds in 1950 to 289,160,000 pounds last year.

Cotton bucked the postwar trend toward rayon and nylon largely because of the inadequacy of sufficient producing capacity for the synthetic cord and fabric, an inadequacy now being erased through major plant expansion programs for both rayon and nylon. The temporary nature of the gain for cotton was evidenced in the first quarter of 1952, when rayon tire cord and fabric output hit a new high of 88 million pounds, while cotton declined to 60.5 million pounds.

On July 21 the DPA announced approval of certificates of necessity for rapid tax amortization providing an additional 101,880,000 pounds of nylon fiber capacity by the end of 1955. The authorizations making up this total were:

Company	Location	Cost	Capacity—Lbs.
E. I. du Pont de Nemours & Co., Inc.	Chattanooga, Tenn.	$22,426,000	40,200,000
	Seaford, Del.	6,453,000	16,800,000
	Martinsville, Va.	13,764,000	24,880,000
Allied Chemical & Dye Corp.	Not yet selected	23,165,000	20,000,000

DPA previously had announced certificates of necessity granted to the Chemstrand Corp. for 50 million pounds of nylon, and this project, and the four listed above, complete the expansion goal of the DPA. The agency had set a target of 270 million pounds of nylon capacity for 1955, with the five necessity certificates noted above accounting for 151,880,000 pounds, and the currently existing capacity the balance. If the exansion target is met—and du Pont recently announced expansion plans based on the tax incentive certificates—the nation's nylon capacity in 1955 will more than double existing capacity.

In late July the DPA denied an extension of a necessity certificate previously granted to the Eastern Rayon Co. for a $9,025,000 high-tenacity rayon plant at Parkersburg, W. Va., when the original term of the certificate had expired, and the company had not begun construction. DPA officials pointed out that high-tenacity rayon expansion plans have been proceeding so rapidly that it could afford to deny Eastern Rayon's request without jeopardizing the government's target for expanding capacity of the material.

Chemical Expansions

DPA reported in August that it had granted certificates of necessity for rapid tax amortization to fill almost completely its expansion goal for styrene monomer and methyl styrene. The target is an annual total capacity of 1,210 million pounds of styrene and methyl styrene by 1955, an expansion of 584 million pounds over the 626 million pounds which existed on January 1, 1951. In late August the agency had approved an overall benzene expansion program, determining a policy to approve for rapid tax amortization sufficient facilities to permit benzene capacity to keep pace with the expansion scheduled for styrence, of which it is the major constituent.

Officials indicated that necessity certificate approvals by late August had nearly filled that general goal, too, and the Petroleum Administration for Defense, on August 13, disclosed that the oil industry was well along with plans to attain an even greater expansion in benzene facilities than mapped out for it by DPA a year ago. Most of the benzene expansion contemplated by DPA will come from petroleum facilities, although some will come through the expansion of steel capacity from 100 million to 120 million tons. The traditional source of benzene is the coke ovens of the steel mills, which produce it as a by-product at a current contract price of about 32¢ a gallon for one degree nitration material. The contract price for petroleum benzene is about 42¢.

DPA had set a target last year of 8,450 barrels a day of benzene from petroleum (129,538,500 gallons a year), but the oil industry has asked already for approval of 18 construction projects designed to yield 9,016 barrels a day. DPA reported that construction has begun on 13 projects with a capacity of 5,887 barrels daily, and 3,625 b/d of that will be completed in 1952. By next July the total completed will rise to 7,510 b/d and by January 1, 1954, a capacity of 8,456 b/d will be ready.

It may be recalled that DPA in April announced an expansion goal to bring non-government produced butadiene capacity to 162 million pounds a year by January 1, 1954, an increase of 101 million pounds over that existing on January 1, 1951. Much of this expansion is planned to meet increasing requirements for special-purpose nitrile rubber and high styrene rubbers, as well as for adiponitrile, a basic intermediate for nylon.

Higher Car Output Helpful

Tire manufacturers selling for original equipment got some helpful news when the Defense Transport Administration recommended in August that the automobile industry be authorized to build 2.5 million passenger cars and 600,000 trucks in the first half of 1953, the highest unit production yet permitted under the Controlled Materials Plan. The recommendation went to DPA, which sets the goals and allocates the steel and other materials under CMP.

The proposed level, on a quarterly basis, is 100,000 passenger cars and 25,000 trucks higher that DPA is permitting under CMP for the October-December quarter of this year. The fourth-quarter level was set at 1,450,000 passenger cars and 275,000 trucks. Steel allotments already have been issued for the fourth quarter for 80% of the cars to be built in that period, and it is problematical whether the steel strike will impair the industry's ability to produce its full quota. The car builders told NPA last month they will need additional allotments, but NPA thought it likely that the big producers could stretch their inventories of steel in order to meet the unit ceilings.

Meanwhile a report from Detroit said that auto industry executives believe that the recent steel strike will cut into their pre-strike estimate of 4.5 million new cars in 1952. The industry turned out about 2.2 million cars in the first half and, because of delays in restoring materials inventories, does not expect to make more than 1,950,000 new cars in the July-December period, a total for the year of 4,150,000 automobiles.

With tire and tube inventories clogging warehouse and dealer shelves, tire manufacturers are expected to cut down production through the rest of this year. The recommendation for 2.5 million cars and 600,000 trucks in the first half of 1953, which should help matters some, reportedly stands an excellent chance of adoption by DPA.

General Tire Heads Production Pool

The General Tire & Rubber Co. is heading up a group of small companies in a "production pool" designed to acquire prime defense contracts for precision electrical equipment, it was announced in Washington on August 21 by the Small Defense Plants Administration.

Although it is the sixteenth small business production pool approved by the SDPA, this is the first in which a large company combines its resources with those of smaller companies to their mutual advantage, the agency stated. The other firms invited by SDPA to form this production pool, known as the General Tire Production Pool, Inc., are Ectro, Inc., Delaware; Jackson Electric & Mfg. Co., Akron; McCaskey Register Co., Alliance; and Sterling Mfg. Co., Cleveland, all in O.

The smaller firms will benefit from the arrangement by having available General's financial and other resources to obtain prime defense contracts in the precision electrical field. General will benefit by being able to seek such contracts—which it is not fully equipped to handle by itself—on the strength of its ability to sub-contract among the other members of the pool.

"Unlike most small business production pools, which are encouraged to obtain any kind of defense contracts they can perform, this pool is, because of its nature, limited in scope," SDPA said. "It will not work in the tire and rubber field,

and other concerns in the tire and rubber field will not be admitted to membership," the agency said.

The prime contracts will be held by General Tire & Rubber, not by the pool. SDPA Administrator Telford Tayler said he expects that the items to be manufactured under the pool arrangement will be of the type not generally considered by defense procurement officers as suitable for manufacture by small concerns.

"It is expected," he said, "that the pool will be of primary benefit to the small companies who belong to it."

U. S. News Report

Collyer Analyzes Cartels and Their Consequences

John L. Collyer, president of The B. F. Goodrich Co., made public in August, No. 14 in a series of rubber studies entitled, "The Rubber Outlook and a Study of Cartels and Their Consequences," in which he discussed at some length the two subjects being considered currently by the Working Party of the International Rubber Study Group in connection with international control of rubber. The subjects for consideration outlined in the "terms of reference" raised two questions: (1) Whether measures designed to prevent burdensome surpluses of rubber are *necessary*. (2) Whether such measures are *practicable*.

Rubber Consumption to 1960

With regard to the first question, figures for new rubber consumption for 1900-1951 were given, and it was added that an analysis of the possibilities for continued growth leads to the conclusion that rubber consumption in the future will be far higher than in the past. Careful studies of the probable increase in population in the United States and of the increase in demand for rubber-equipped vehicles and for other rubber products support the conclusion that, by 1960, at least 1,600,000 long tons of new rubber will be required in the United States. The probability that this estimate is on the conservative side is revealed by the comparison of the increase in consumption per person from 1900 to 1960 given below:

New Rubber Consumption per Person in the United States, 1900-1960

Year	Lbs. per Person	% Increase in 10-Year Period
1900	0.6	..
1910	1.0	70
1920	4.3	24
1930	6.8	58
1940	11.0	62
1950	18.6	68
1960*	20.6	11

*Estimated.

It was pointed out that the rate of increase in consumption per person from 1950 to 1960 of 11%, as estimated above, is far below the rate for any previous 10-year period in this century.

There is an even greater opportunity for an increase in the consumption of rubber in the rest of the world. A comparison of the 1940 and 1950 records of a number of countries is given below:

New Rubber Consumption per Person in Principal Countries Other Than the United States, 1940 and 1950

In Pounds

Country	1940	1950
Canada	7.28	11.11
United Kingdom	6.83	9.84
Australia	6.36	9.41
France	1.97	5.74
Germany	2.13	3.86
Brazil	0.25	0.97
Russia*	0.26	0.92
China*	0.03	0.15
India	0.06	0.11

*Estimated.

It was said that by 1960 it was expected that the rest of the world would require at least 1,400,000 long tons of new rubber a year.

Additional quantities of rubber required to build up stocks of the consuming industry and strategic stockpiles owned by governments were estimated at 40,000 in 1953 and 20,000 tons each year 1956 through 1960 for private stocks and 200,000 tons in 1952 and 50,000 tons in 1953 for government strategic stockpiles.

The Collyer study noted that today there are ample supplies of crude natural rubber in the United States to meet our military and essential civilian needs for a five-year all-out war, even if we were not able to import another pound during the entire period. Collyer urged that no further purchases for addition to the stockpile be made by the government unless approved by Congress

These estimates of rubber demand were summarized, and it was suggested that the probable year-to-year growth trend will be approximately as follows:

By comparing the estimates of crude natural rubber production with the estimate of total new rubber demand, estimates of the probable minimum requirements for synthetic rubber, if all the natural rubber produced is consumed or stockpiled, were outlined in the table above.

Annual capacity for synthetic rubber was estimated at 1,040,000 long tons for the United States, 75,000 tons for Canada, and 6,000 tons for West Germany at the present time. Of the United States capacity of 1,040,000 tons, however, 220,000 tons of GR-S capacity is currently dependent on high-cost alcohol butadiene; therefore the effective total free world capacity for synthetic rubbers is now about 900,000 tons.

Technological progress, such as the oil extended GR-S process now being perfected and new catalysts, will probably result in an increase in world capacity to about 1,050,000 tons a year, excluding all rubber from high-cost alcohol butadiene. If 1960 synthetic rubber requirements for 1960 amount to 1,420,000 tons, however, it is probable that additional capacity must be constructed before the end of the present decade, it was pointed out.

Rubber Production to 1960

If these estimates of new rubber demand and supply are reasonably accurate, there is little likelihood of a serious shortage of rubber in the next few years, and there should be ample time to build whatever additional synthetic rubber capacity may be needed in the late 1950's.

Estimated New Rubber Consumption and Additions to Stocks 1952-1960

In Thousands of Long Tons

Year	Total‡	USA	Rest of World‡	Addition to Stocks	Total Demand
1952*	2,325	1,255	1,070	240	2,565
1953†	2,500	1,325	1,175	50	2,550
1954†	2,500	1,325	1,175		2,500
1955†	2,500	1,325	1,175		2,500
1956	2,600	1,380	1,220	20	2,620
1957	2,675	1,420	1,255	20	2,695
1958	2,750	1,460	1,290	20	2,770
1959	2,875	1,530	1,345	20	2,895
1950	3,000	1,600	1,400	20	3,020

*Estimates of the International Rubber Study Group, May 10, 1952.
†Assumes that the military demand in these years will taper off enough to offset the normal growth in civilian demand.
‡Except synthetic rubbers in Russia and Russian-occupied areas.

Rubber Production To 1960

With regard to the outlook for rubber supplies, the maximum annual output of crude natural rubber in any year during the 1952-1960 period will not exceed 2,000,000 tons, and the average may range from 1,600,000 to 1,800,000 tons, it was said.

Comparison of Estimated Total Demand for New Rubber with Estimated Production of Crude Natural Rubber,* 1952-1960

In Thousands of Long Tons

		Minimum Synthetic Requirements	
Year	Total New Rubber Demand	Based on Possible Average Natural Production*	Based on Practical Maximum Natural Production*
1952	2,565	965	765
1953	2,550	950	750
1954	2,500	900	700
1955	2,500	900	700
1956	2,620	1,020	820
1957	2,695	1,096	895
1958	2,770	1,170	970
1959	2,895	1,295	1,095
1960	3,020	1,420	1,220

*For natural rubber production, the possible average for each year is 1,600,000 long tons; the practical maximum, 1,800,000 long tons.
†From "Total Demand" of the previous table.

Several possibilities which might change this outlook, such as, leaf-blight in the Far East curtailing natural rubber output, higher demand for military products than now foreseen, a more rapid growth in demand for civilian products than estimated, and another war scare, were considered, but it was felt that if a competitive economy continues in the free world, no shortage of rubber should develop.

"Burdensome surpluses" were not thought to be likely either since the present market for crude natural rubber at a price competitive with synthetic rubber is estimated at around 1,650,000 long tons a year (700,000 tons in the United States and 950,000 tons in other countries). This market will increase in future years.

Past experience supports the conviction that the above quantity of natural rubber probably will not be forthcoming at prices which approximate those for GR-S. Many smallholders and inefficient estates may find it more profitable to produce commodities other than rubber, and thus there should be no surpluses of natural rubber.

The output of synthetic rubbers can be reduced quickly, therefore there should be no surpluses of these rubbers.

Since the probabilities are that the world will not face either a surplus or a shortage of natural or synthetic rubber in the next few years, no international commodity agreement or cartel is necessary to protect the rubber producers, and, certainly, a cartel is not necessary to protect rubber consumers, Collyer stated.

Rubber Cartel Not Practicable

The second question, whether measures designed to prevent burdensome surpluses or serious shortages in rubber are *practicable*, was next discussed from many angles. The necessity of agreement on a restriction scheme by *all* rubber producers, the very complex administrative problems of a restriction scheme, the fact that natural rubber now has a competitor in synthetic rubber, and the possibility of the creation and maintenance of "buffer stocks" were covered, as well as many other items.

It was concluded that a natural rubber cartel could not reduce for an extended period the "uncertainties of rubber production, consumption, and price," and such a cartel was not *practicable*.

Consideration was also given to a cartel designed to regulation the production of all kinds of rubber, both natural and synthetic, and it was concluded that an international cartel of this type would not be practicable at *any* time.

In summary, the Collyer study concluded that within this decade:

1. There will be a market for all the crude natural rubber which can be produced at a price competitive with GR-S.
2. There is little likelihood of a "burdensome surplus" of natural rubber.
3. Except in the event of another world war, "serious shortages" of rubber can be prevented by increasing the output of synthetic rubbers.
4. Therefore a cartel to prevent "burdensome surpluses" or "serious shortages" is not necessary.
5. A cartel to regulate the output of natural rubber would increase production costs and would ultimately cause the consumption of natural rubber to decline.
6. A cartel to regulate the output of all kinds of rubber could not be organized during this period of international tension.

Alternate Actions Suggested

Collyer suggested that other actions should be taken by the United States Government and by the governments of the natural rubber producing areas that would be of immediate and long-range benefit to all the peoples of the free world.

Action by the U. S. Government on the following matters was recommended:

1. Sell or lease to private industry as quickly as possible all government owned synthetic rubber producing facilities. National security in rubber has been achieved, and there is no justification for competition by the U. S. Government with private producers of natural rubber in other nations.
2. Until the U. S. owned synthetic facilities are disposed of, maintain the selling prices of government produced rubbers at levels which will recover full costs and return a reasonable profit on the invested capital.
3. Issue a clear-cut statement of policy assuring both producers and consumers of rubber that the strategic stockpile of natural rubber now owned by the government will be used only for the purpose of military and essential civilian security and will, *under no circumstances, be used to manipulate rubber prices.*

Actions recommended to the governments of the natural rubber producing countries to advance the interests of their own peoples were:

1. Encouragement for the growing of food by rubber producers and the diversification of crops, thus providing protection against declines in natural rubber prices.
2. Encouraging lower production costs by bud-grafting and seed selection to increase yields, and greater mechanization of methods of collection, washing, drying, and milling of crude natural rubber.
3. Educating the smallholders to improve the quality of the grades of rubber they produce so that they may obtain a higher price for their product.

Such constructive government actions will make it possible for the reasonably efficient natural rubber producers to compete successfully for a large share of the rubber market and will provide a sound foundation for permanent improvement in the standard of living in the natural rubber growing areas, Mr. Collyer further declared.

Such a program should be of major assistance in the fight against Communism in those areas, and such action should be in accord with the sound concept that a dynamic expanding world economy will, through increased production, bring higher standards of living to all peoples, he concluded.

RMA Natural Rubber Seminar Starts September 15

Some further details of the "Natural Rubber Quality and Purchasing Seminar" being sponsored by the Crude Rubber Committee of The Rubber Manufacturers Association, Inc., in addition to that which appeared in our July issue (page 522) have been received from W. J. Sears, vice president of the RMA and chairman of its Crude Rubber Committee.

The program has been revised from a one-day affair to be repeated on the second day to a full two-day program, and it is stated that the program is primarily designed to be educational rather than promotional, with the objective that every individual attending the meetings will have ample opportunity to obtain answers on a personal basis to his questions.

These educational meetings are open to all rubber manufacturing companies regardless of affiliation with the RMA. The hope was expressed by Mr. Sears that all rubber manufacturers become specifically acquainted with the most effective and efficient methods of purchasing and inspecting natural rubber.

The meetings are scheduled for the following cities on the dates given: Akron, O., September 15 and 16, Mayflower Hotel ballroom; Trenton, N. J., September 30 and October 1, Stacey-Trent Hotel ballroom; New York, N. Y., October 14 and 15, Hotel Statler Georgian Room; Boston, Mass., October 21 and 22 Hotel Somerset, Louis XIV ballroom; Chicago, Ill., November 18 and 19, Hotel Congress Gold Room; Los Angeles, Calif., December 9 and 10, Statler Hotel.

Also during the meeting of the Division of Rubber Chemistry, A. C. S., in Buffalo, N. Y., October 29, 30, and 31, there will be a panel exhibit and display of RMA Type Samples. Mr. Sears will present a paper dealing with crude natural rubber quality and packing problems and inspection procedures. There will, however, be no formal seminars of the type scheduled for the other cities here listed.

For the other cities listed above the following program is scheduled.

RMA NATURAL RUBBER QUALITY AND PURCHASING SEMINAR

First Day

10:00 a.m. Presentation of papers by members of the RMA Crude Rubber Committee:

1. "Natural Rubber Quality Trends Since World War II and the Functions of the RMA Crude Rubber Committee."
2. "The Historical Development and the Present Purpose of RMA Natural Rubber Type Samples and Type Descriptions."
3. "The Purpose and the Effectiveness of RMA Natural Rubber Packing Specifications."
4. "Rules and Regulations (Contract Terms) Covering Transactions between Sellers and Factory Buyers of Natural Rubber."

11:30 a.m. Recess.

11:45 a.m. "Accepted Methods for the Visual Inspection of Natural Rubber against Official Type Samples."

12:30 p.m. Presentation of a color movie film showing arrival, discharge, and inspection of a cargo of natural rubber.

1:00 p.m. Luncheon.

2:30 to 5:00 p.m. Visits by individuals to natural rubber quality and packing display and individual examination of official RMA-type samples for all types and grades of natural rubber. Members of the Type Sample Committee will be on hand to answer any questions on rubber types and grades as well as individual questions on inspection procedures.

Second Day

10:00 a.m. Question and Answer Session. A panel of experts on natural rubber procurement, quality, and inspection will answer any qestions from the floor; provision will also be made for submission of written questions in advance.

11:00 a.m. Inspection Demonstration. Persons attending are invited to bring samples of natural rubber which they have purchased and on which they may question the accuracy of the type or grade. Experienced natural rubber inspectors will compare such samples with official types and will classify them as to correct type and grade. If the date and grade as purchased and cost are shown on the sample, a qualified judgment will be given as the proper allowance that should have been sought. Company identification will be kept confidential, if desired.

12:30 p.m. Concluding Remarks.

1:00 p.m. Luncheon.

2:30 p.m. Visits by individuals to the natural rubber quality and packing display and individual examination of official RMA-type samples for all types and grades of natural rubber. Members of the Type Sample Committee will be on hand to answer any questions on rubber types as well as individual questions on inspection procedures.

Attention of interested parties was especially directed to the "question and answer" and "inspection demonstration" parts of the program.

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Three of Big Four Grant 10¢ Wage Raise

The negotiations mentioned last month between the Big Four rubber companies and the United Rubber Workers of America, CIO with Goodyear Tire & Rubber Co and with United States Rubber Co. for a wage increase only, and with Firestone Tire & Rubber Co. and The B. F. Goodrich Co. for both a wage increase and a new working conditions contract resulted in the following actions towards the end of August.

Goodyear and URWA came to an agreement on August 9, retroactive to August 8, on a 10¢-an-hour wage increase for 30,000 Goodyear workers in its several plants, if approved by the Wage Stabilization Board. The settlement calls for the company and the union jointly to petition the WSB for approval of the wage increase.

Straight-time earnings of the 20,000 workers in the Akron plant will be increased to $2.20 an hour; while earnings of production workers elsewhere will average about $2.03 an hour.

U. S. Rubber announced August 13 that it had signed a new wage contract with URWA calling for a 10¢-an-hour wage increase effective August 11. The new contract, subject to approval by WSB and union locals, covers 35,000 employes in 19 plants throughout the nation.

Goodrich plants in nine cities were struck by the URWA on August 18 while negotiations for a new contract went into the eleventh week. The strike was called because of disagreement of certain fringe issues in working conditions in the new contract. The company had already offered and URWA accepted a general wage increase of 10¢-an-hour, so that wages were not thought to be an issue in this strike. Union officials claimed, however, that the increase was tied into contract proposals that are not comparable to other agreements which are in existence.

It was announced on August 25 that Firestone and URWA had reached an agreement on a two-year contract including a general wage increase of 10¢ an hour. A joint management-union statement said the agreement would run until June 10, 1954. The wage increase subject to WSB approval, will be effective from August 18. Working condition provisions were also settled, including modification of union and company security provisions in effect since October, 1950.

Other companies granting 10¢-an-hour wage increases during August were General Tire & Rubber Co., Seiberling Rubber Co., Kelly-Springfield Tire Co., and Gates Rubber Co.

It is understood that about 5¢-an-hour of the 10¢-an-hour increase can be approved by WSB without relaxing its rules. The decision whether or not to relax the rules to permit the 10¢-an-hour increase will probably depend on the position finally taken by the public members, all but two of whom are new.

C. A. Litzler, president of Industrial Ovens, Inc., 13825 Triskett Rd., Cleveland 11, O., embarked August 20 on the *Ile de France* for a two-month tour of Italy, France, Germany, Holland, Belgium, and England to discuss tire cord processing systems with more than 40 leading manufacturers in Europe.

Firestone Plastics

(Continued from page 787)

sale of Velon films under the trade name of "Beutafilm," both printed and plain, and in an expansion program will add a line of Velon upholstery sheetings for retail yard goods sale. All manufacturer accounts formerly serviced by Hartford will hereafter be handled directly by the Firestone Plastics organization.

Sales personnel of Hartford's manufacturer's sales division has been absorbed by Firestone Plastics so that there will be no lapse in customer service.

Firestone Plastics in consequence has made additions and changes in its staff following this recent expansion of its activities.

Charles F. Edelmann has been appointed staff trade manager of sales of Velon film. Mr. Edelmann, formerly New York sales representative for the film division, will continue to operate from the New York office, 350 Fifth Ave.

E. H. French, Jr., has been named manager of the contract printing division, with headquarters in Pottstown. Mr. French had been sales representative of the Velon film division for the Cleveland area.

Miss Fritzi Reckendorf has been named stylist of printed films, assisted by Frank Skoog and Miss Adelaide Werner. Formerly with Hartford Textile, they will now make their headquarters at the Firestone Plastics sales offices in New York.

The Cleveland area will be represented in the film division by Keith Scanlan, previously in charge of Velon film sales in Chicago. Mr. Scanlan's office is in the B. F. Keith Bldg., Cleveland, O.

Samuel Briscoe, who operated from the Pottstown plant, will handle Velon film sales for the Chicago area, with headquarters at Firestone sales office at 666 Lake Shore Dr.

Frank Bates will handle the sale of all Velon products, including films, in the New Jersey-Baltimore area. Mr. Bates was formerly operating assistant to Vice President Elmer French.

J. Gurney Wilson has been named southwestern sales representative and will make his headquarters in Dallas at the new Firestone offices at 500-2 Exposition Ave. He will supervise the sale of all Velon products, including light-gage films, upholstery-type sheetings, and extruded yarns in that area. Mr. Wilson was formerly with Phillips-Davis, Inc., High Point, N. C.

John Kavanagh comes from Hartford Textile to handle Velon flex and film sales in the St. Louis area, with offices at 611 Olive St., St. Louis, Mo.

Ronald Malarney, also formerly associated with Hartford Textile, will handle Velon flex and film sales in the New England area and will be at Room 448, 120 Boylston St., Boston, Mass.

Du Pont Removal Notice

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has moved the main West Coast office of its dyes and chemicals division and rubber chemicals division to 845 E. 60th St., Los Angeles, Calif., with A. J. Mease as manager. Customers in the San Francisco area may continue to direct inquiries to 111 Sutter St., San Francisco, and customers in the Pacific Northwest to the du Pont sales office at 1238 N.W. Glison St., Portland, Oreg.

Stamford Office for Kentucky Synthetic

Thomas Robins, Jr., president of Kentucky Synthetic Rubber Corp., announced in Louisville, Ky., on August 19 that the company will shortly establish a headquarters office in Stamford, Conn. Kentucky Synthetic is made up of eleven non-tire rubber goods companies that participate in the ownership and management of the corporation and in operating the plant at Louisville for the Synthetic Rubber Division, RFC. One of them, KYS Corp., consists of a group of nine footwear manufacturing concerns. The other ten are Hewitt-Robins, Inc., of which Mr. Robins is also president; American Hard Rubber Co.; Boston Woven Hose & Rubber Co.; Brown-Rubber Co., Inc.; Goodall Rubber Co.; Raybestos-Manhattan, Inc.; Sheller Mfg. Corp.; Simplex Wire & Cable Co.; Sponge Rubber Products Co.; and Thiokol Corp.

Kentucky Synthetic has substantially completed the $1,300,000 plant conversion program for making cold rubber (LPT GR-S), as a part of the overall RFC LTP GR-S expansion program.

In discussing generally the future of the synthetic rubber industry, Robins said that very substantial improvements in the serviceability of synthetic rubber had taken place during the past three years, accompanying the development of the low-temperature process and equipment of the type now installed at the Louisville plant. It is the general opinion of experts in the rubber industry that LTP GR-S is now equal to or superior in quality to natural rubber in approximately two-thirds of all rubber usage.

Palmer and Erwin Advanced

Robins also announced that Henry F. Palmer, general manager of the Louisville plant since its reactivation in 1950, has been elected a vice president of Kentucky Synthetic and will move to Stamford about November 1.

Howard R. Erwin, formerly director of engineering, succeeds Dr. Palmer as plant manager at Louisville.

Howard W. Cable, formerly production manager, has been promoted to the post of associate plant manager.

At a meeting of the board of directors of the company held in New York, N. Y., August 14, Raymond F. Hart was elected treasurer. Y. J. Riveiro was reelected controller of the company.

Evans in New Post

Charles P. Evans, formerly assistant plant manager of the Firestone Tire & Rubber Co. plant at Noblesville, Ind., has been appointed works manager of the Arrowhead Rubber Co. plant at Downey, Calif., a subsidiary of National Motor Bearing Co., Inc. Evans affiliated with Firestone immediately after college and during the war was in charge of the tank track production for Firestone at Noblesville and in three subcontracting plants. He also had important administrative as well as technical responsibilities in connection with conversion of the Noblesville plant at the war's end when the company changed to the manufacture of precision molded rubber parts chiefly for the automotive industry. Arrowhead manufactures molded and extruded rubber parts for a wide variety of industries.

Awards for Glycerine Research

The Glycerine Producers' Association, 295 Madison Ave., New York 17, N. Y., has established a group of awards for outstanding research in the application of glycerine and its derivatives. The awards consist of an honor plaque carrying a cash stipend of $1,000, and two honor certificates with cash stipends of $300 and $200, respectively. Research work eligible for nomination may be concerned with the chemical, physical, or physiological properties of glycerine or glycerine-containing or derivative materials.

The awards are open to any individual in the United States and Canada engaged in research either in industry or in affiliation with a government or educational institution. In the latter case both faculty and college students are eligible. Nominations for the 1952 awards must be in the hands of the Association's awards committee by November 15. If possible, the awards will be made in person at the Association's annual convention on January 27, 1953. Official entry blanks for making nominations are available upon request.

Aromex 115 Production Expanded

J. M. Huber Corp., 100 Park Ave., New York 17, N. Y., has increased production facilities for its improved grade of oil furnace black, Aromex 115, made at its new plant near Baytown, Tex. According to R. H. Eagles, company vice president, the black gives 15% increased tread wear in tires over standard "high abrasion furnace" blacks under average conditions.

Articles on Plant Instrumentation

Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Philadelphia, Pa., in the Second Quarter, 1952, issue of *"Instrumentation"* has articles on the use of its instrumentation systems in different types of industrial plants. "From Ink to Tires," by R. Reinke, Continental Oil Black Co., describes the instrumentation at the company's oil black plant at Westlake, La., and "Rubber for the Rolling Caissons," by J. A. Pollock, General Tire & Rubber Co., and J. Procopi, Minneapolis-Honeywell, covers General's synthetic rubber plant at Baytown, Tex. .

Financial World, 86 Trinity Place, New York 6, N. Y., has announced that from the 5,000 corporation annual reports for 1951 rated in the twelfth annual survey, 13 rubber and tire companies are being cited with "Merit Award" certificates. These companies are: American Hard Rubber Co., Armstrong Rubber Co., Dayton Rubber Co., Firestone Tire & Rubber Co., General Tire & Rubber Co., The B. F. Goodrich Co., Goodyear Tire & Rubber Co., Hewitt-Robins, Inc., Midwest Rubber Reclaiming Co., Seiberling Rubber Co., Thermoid Co., Thiokol Corp., and United States Rubbber Co.

Dayton Rubber to Acquire West Coast Latex Firm

The Dayton Rubber Co, Dayton, O., has announced that subject to satisfactory completion of audits now in progress, Dayton Rubber would exercise its option to acquire all the outstanding stock of American Latex Products Corp., Los Angeles, Calif., foam rubber producer.

Details of the acquisition basis will be announced upon final completion of the transaction. American Latex is privately owned. Dayton Rubber is listed on the New York Stock Exchange. American Latex Products, during the fiscal year ended June 30, 1952, approximated $3,000,000 in sales. Dayton Rubber, in the fiscal year ended October 31, 1951, had net sales of $54,602,954.

Formed in 1946, American Latex is a large supplier of foam rubber products for the West Coast aircraft industry. It makes mattresses, cushions, and other foam items for the large and expanding Los Angeles furniture industries. It also produces a sponge rubber product of its own development under the trade name "Moltex," is among the largest U. S. manufacturers of office seat cushions, and is a major factor in the West Coast adhesive market, producing "Stabond" adhesives for defense and general manufacturing.

Founded and headed by C. M. Christie, pioneer in foam rubber on the West Coast, as president and general manager, American Latex has grown rapidly. With a relatively small expense for expansion, officials say it could handle a sales volume in excess of $5,000,000. Mr. Christie and other key officers will continue to operate the firm under its present name as a separate corporate division of Dayton Rubber. No executive personnel changes are planned.

By the acquisition of American Latex, Dayton Rubber, founded in 1905, is continuing its long-term diversification policy. Its best-known products include Koolfoam pillows and other foam rubber products, Thorobred tires and V-belts, Dayco textile products, and Dayco rollers.

Port Neches GR-S Expansion

The Port Neches, Tex., GR-S plant operated for RFC by Naugatuck Chemical Division, United States Rubber Co., Rockefeller Center, New York is being converted from "hot" to "cold" rubber and its production capacity increased from 70,000,000 long tons to more than 100,000 long tons annually as part of the government's synthetic rubber expansion program. The conversion and expansion program at the plant is expected to be completed by late fall and will cost approximately $2,500,000.

Vibrin Output Being Doubled

Naugatuck Chemical also is doubling the capacity of production facilities for Vibrin polyester resins at its Naugatuck, Conn., plant. Demands for Vibrin resin as a structural material in combination with glass fiber have increased steadily during the past year, particularly for the manufacture of chemical resistant pipe, translucent and transparent sheet materials, machine housings, materials handling equipment, radomes and other aircraft parts, boats, and plastic bodies for sports cars.

Carbon Black Anniversary Dinner

To commemorate the fortieth anniversary of the use of carbon black as a reinforcing agent for rubber, Binney & Smith Co. tendered a dinner to a group of rubber company executives and Columbian Carbon Co. officers at the Portage Country Club, Akron, O., on the evening of July 22. Presiding for the host were A. F. Kitchel, president, and J. M. Hamilton, vice president, of Binney & Smith; and representing Columbian Carbon, were C. E. Kayser, president, and L. L. Shepard, treasurer.

In 1912 when the reinforcing properties of carbon black were first applied to rubber tires, it was Mr. Kitchel who made the initial visits to Akron, making arrangements for Binney & Smith to supply The B. F. Goodrich Co. with the pioneer shipments of carbon black.

Employes Solve Rubber Problem

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., has announced that a troublesome problem was recently solved when five employes submitted an ingenious suggestion for removing a rubber-like coating from aluminum plates and frames at the company's Willow Island, W. Va., plant. Their suggestion, that the coating simply be dissolved in toluene, ended the time-consuming manual method of scraping and chipping away the excess rubber-like material called Neobon. The group of employes, awarded $1,360 for the idea, consisted of Marl Riser, Ben Brothers, Dandy Cronin, Garred Vinson, and Earl Hescht. Last year 26,986 ideas were submitted through the company's Suggestion System.

New York Belting Promotes Franklin; Adds Durbin

C. A. Franklin, Jr., has been appointed western district sales manager of the New York Belting & Packing Co., Passaic, N. J. His territory extends from the Rocky Mountain states to the West Coast, from the Canadian to the Mexican border and the Hawaiian Islands. Mr. Franklin has been with the company for 17 years. He succeeds O. L. Wall, who died June 29.

John C. Durbin, Jr., has been appointed a factory sales representative for New York Belting & Packing Co. in Washington, Oregon, and Idaho. He will make his headquarters in Portland, Oreg. For the past several years he has been on the company's San Francisco staff.

Heyden Chemical Corp. has moved its executive offices from 393 Seventh Ave. to 342 Madison Ave., New York, N. Y. These new offices will also be used as headquarters for the sales department of the subsidiary, American Plastics Corp., and for the Heyden medical department, both of which were formerly at 225 W. 34th St., and for the Heyden market development, technical sales, and advertising departments, formerly at the Garfield, N. J., division.

Artist's Drawing of New Home of Akron Rubber Machinery Co.

In New Quarters

Akron Rubber Machinery Co., Inc., which specializes exclusively in rubber working equipment, is now settled in its new quarters at 200 S. Forge St., Akron, O. The building provides 50,000 square feet of floor space, a 20-ton overhead crane, and railroad siding facilities.

The company further reports that at present it has one of the largest inventories of rubber processing equipment in the country available for inspection at its warehouse.

J. R. Maus, formerly with L. Albert & Son, has joined the engineering and sales force of Akron Rubber Machinery Co.

Rubber in Jet Aircraft

Rubber products are vital to jet aircraft, as shown in the accompanying diagram prepared by The B. F. Goodrich Co., Akron, O. These applications range from tires and tubes to anti-icers for the Pitot tube, used to measure air speed. The industry is continually striving to improve rubber aircraft products and develop new items to keep pace with rapidly expanding jet production.

Frank Sherry Transferred

Frank Sherry has become production manager of the plastic products division at the Marietta, O., plant. He moved to the new post from B. F. Goodrich Rubber Co. of Canada, Ltd., where he was production manager of the processing division.. Sherry has been with the rubber company for the past 11 years. He began in the chemical laboratory and later became floor foreman and general foreman. He was general foreman of the Goodrich processing division in Akron before moving to Canada.

Record Tubeless Tire Output

Production of tubeless tires is currently at an all-time high, according to John L. Collyer, Goodrich president.

"More than a million tubeless tires have already been delivered to American motorists, and the present rate of production in our plants is nearly triple that of last year as a result of the new standards of safety, service, and mileage the new tire has established," Mr. Collyer said.

Sardines Transferred by Hose

Rubber suction hose made by Goodrich is being used in the sardine fishing industry to reduce loading time from net to carrier ship and from ship to cannery dock. The hose measures six inches in diameter and has a soft rubber lining so that the fish will not be bruised in passage. Fishermen lower the hose into the fish-filled nets and then turn on a pump to develop suction within the hose. Sucked into the water stream thus created, the sardines pass upward through 30 feet of hose, from net to boat, in record time. The cannery dock is equipped with the same type of hose, which is used to clean the boats of their cargoes in minutes instead of the hours formerly required.

Controllers Institute, 1 E. 42nd St., New York 17, N. Y., has announced that Allen H. Ottman, vice president and director, American Hard Rubber Co., New York, has been elected vice president of the New York City Control of the Institute. At the annual meeting of the organization's Cleveland Control, J. E. Caldwell, assistant controller, Goodyear Tire & Rubber Co., Akron, was chosen a director. One of the new directors of the Boston Control is Frederick L. Patton, vice president, Cambridge Rubber Co., Cambridge, Mass.

New York Quartermaster Procurement Agency, 111 E. 16th St., New York 3, N. Y. recently announced the awarding of the following contracts for: *women's raincoats*, to I. G. Rudow & Sons, Inc., Brooklyn, N. Y.: 22,440, $84,118 *adhesive tape*, 193,424 rolls, $313,414 to Sanette Mfg. Co., Inc., New Rochelle, N. Y.

Plan New Polyethylene Plant

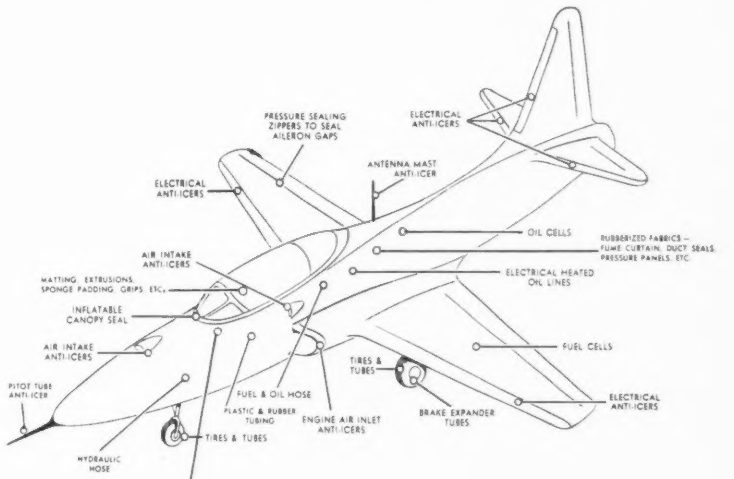
Carbide & Carbon Chemicals Co., Division of Union Carbide & Carbon Corp., New York, N. Y., has announced that design and engineering work are under way for a new plant in Los Angeles County, Calif., to produce polyethylene plastic and ethylene glycol. Certificates of necessity have been issued by the DPA for the project, which will involve an eventual investment of more than $36 million. The plant is being designed to produce 50-60 million pounds of polyethylene and 5-10 million gallons of ethylene glycol annually. It is estimated that the plant will give employment to 250-350 persons. The first of its type on the Pacific Coast, the plant will supply both the Coast and Mountain states.

Kolker Retires

Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O., on August 26 announced a revision in the administration setup of its subsidiary, Kolker Chemical Works, Inc., manufacturer of insecticides and pesticides with plants at Newark, N. J., and Houston, Tex. Leon A. Kolker, founder and president of the company, retired on August 31. The activities of the Kolker concern will continue to be carried on by J. G. Brunton, in charge of Kolker sales, and Charles H. Kolker, in charge of operations and engineering. The functions of these two men will be coordinated under A. L. Geisinger, Diamond Alkali vice president in charge of the organic chemicals division.

NAWMD to Hear Vogeler

Robert A. Vogeler, whose imprisonment behind the Iron Curtain made world-wide headlines, will be the featured speaker at the banquet at the fall meeting of the National Association of Waste Material Dealers, Inc., on October 14 at the Ambassador Hotel, Los Angeles, Calif. The announcement was made by H. L. Green, meeting chairman and regional vice president of the Association.



Diagrammatic View of Rubber Products Vital to Jet Aircraft

Cabot Announces Vulcan C

Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass., has announced the production and commercial availability of Vulcan C, a new conductive oil furnace black with electrical properties said to be superior to those of standard conductive grades of carbon black now commonly used by the rubber industry. Vulcan C will be priced at 11¢ a pound in bags in carload quantities, f.o.b., Texas Panhandle. Vulcan C is pelletized and offers good mixing and processing characteristics, which should be of particular interest to the rubber industry, it was said.

Vulcan C has been tested in both natural and synthetic rubber, and its electrical conductivity has been proved consistently greater than that provided by other grades of carbon black now commonly used. The new black which offers an ideal combination of high conductivity and high reinforcement, is recommended by Cabot for use in rubber compounds wherever outstanding electrical conductivity is required.

Making Hycar Cold Rubber

The first commercial use of a low-temperature polymerization process in privately owned synthetic rubber plants has been started by B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. Hycar oil-resistant rubber made by this method is now available and will provide longer product life and better performance, according to John R. Hoover, company president. Many months of testing and evaluation were needed to convert the cold rubber process, originally designed for GR-S, to fit the properties of Hycar. Use of the low-temperature process gives a rubber, Hycar 1042, whose properties are said to show an improvement over standard grades comparable to that shown by cold GR-S over hot GR-S.

Hycar 1042 maintains the oil resistance, heat resistance, and compression set characteristics of other Hycars, but provides the compounder with significant improvements in tensile strength and elongation at no increase in polymer or compound cost. The new rubber, being made at the company's Louisville, Ky., plant, is available in production quantities.

Name New Sales Agent

American Resinous Chemicals and American Polymer Corp., both of Peabody, Mass., have appointed Vulcan Sales Co., 7414 Jarboe St., Kansas City, Mo., agent for Iowa, Nebraska, Kansas, Oklahoma, northern Texas, and western Missouri.

E. L. Klein, proprietor of Vulcan Sales, has been in chemical sales for the past seven years His wide acquaintance in the industrial field makes him well qualified to handle American Resinous' and American Polymer's latest developments in the fields of latex paints, soil conditioners, coatings, saturants, binders, and adhesive bases.

The appointment of Vulcan Sales makes possible prompt technical service to customers of American Resinous and American Polymer on their wide line of base latices, emulsions, and solutions for general industrial use.

Jack B. Barr

Rea and Barr Advanced

United Carbon Co., Inc., Charleston, W. Va., has announced two changes in its eastern district sales office, with headquarters in New York, N. Y. William S. Rea has been promoted to general sales consultant, a position held by the late William W. Higgins. Jack B. Barr succeeds Mr. Rea as eastern district manager. Mr. Barr is widely known among the carbon black consumers, having been connected for a number of years with Charles Eneu Johnson Co, Inc., Philadelphia, Pa., prior to its acquisition by United Carbon in December, 1949.

Changes at General Tire

Promotions in three key positions of the purchasing department of The General Tire & Rubber Co., Akron, O., were necessitated by the death on July 9 of Robert M. Graham, who had directed General's purchasing operations for more than 20 years.

Donald A. Kepler, assistant to Graham for 13 years, is now general purchasing agent.

Chester J. Zabik, with General more than 20 years, becomes purchasing agent for rubber and all tire fabrics; and Emil F. Schnedarek is purchasing agent for all engineering projects and services.

Kepler joined General in 1929, moved to the purchasing department in 1939 after managing the printing department for 10 years, and was named a purchasing agent in 1944. During World War II, Kepler assisted Graham on the government's rubber-buying committee.

Zabik has filled many assignments since appointment to the purchasing department in 1937. During World War II he was director of priorities for General and also assisted Graham in rubber and tire-fabric purchasing.

Schnedarek, formerly manger of engineering purchasing, came to General as a draftsman in 1929. He has filled executive capacities in both the domestic as well as General's foreign operations. In 1936, Schnedarek went to Poland as project engineer to General's affiliate, Stomil Rubber Co. He has also served as project engineer for General's new plants in Venezuela and Waco, Tex. He joined the purchasing department in 1946.

Erecting Phenol Plant

Monsanto Chemical Co., St. Louis, Mo., has begun construction of a plant on an 86-acre site at Avon, Calif., for the manufacture of phenol. This plant, expected to be in operation by early 1954, will be jointly built and operated by the company's western and organic chemicals divisions. The new plant will manufacture phenol by a process recently developed by the company and will be Monsanto's largest single manufacturing unit on the West Coast.

The product will be supplied to various firms in the growing Pacific Coast industrial area and also will be used by Monsanto to meet the expanding needs of its own western manufacturing operations.

Outlets for the production include petroleum refining and processing, plywood manufacturing, and the making of wood-waste board, insulation, molding compounds, and industrial synthetic resins. Phenol is also a key raw material for the chemical industry.

Mueller Promoted

Robert K. Mueller has been made general manager of the plastics division to succeed the late F. A. Abbiati. Mueller was first employed by Sinclair Co. as a chemist. He came to Monsanto in 1935 as a control chemist at the John F. Queeny plant in St. Louis. In 1938 he was transferred to Monsanto's subsidiary Shawinigan Resins Corp. plant at Springfield and in 1939 went to the company's plastics division there. In 1940 he was promoted to operating superintendent at Springfield and in 1942 was sent to Karnack, Tex., as a member of the Longhorn Ordnance Works production staff. Mueller became general superintendent of production in 1943 and plant manager in January, 1945. At the end of the war, when the Karnack operations closed, he returned to Springfield to become manager of the division's east plant in April, 1946. The next year he was appointed assistant production manager and later production manager, then assistant general manager in October, 1950.

He is a member of the executive committee and board of directors of Shawinigan Resins Corp. He is also the author of "Effective Management Through Probability Controls."

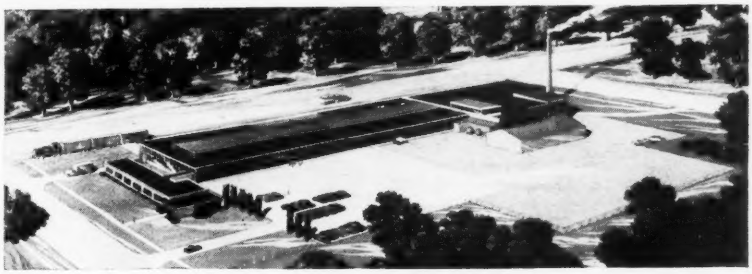
Other Monsanto Appointments

Edwin V. Hellyar has been appointed assistant sales manager of the thermoplastic molding materials department, plastics division; while Francis E. Woodill has been named assistant sales manager for plastic sheet products.

Woodill, in 1928 joined the planning department of the plastics division, transferred to the sales department in 1934, became sales correspondent in 1936, sales representative in the Chicago office of the division in 1939, and in April 1952, assistant branch manager for plastic sales at Monsanto's new Twin Cities (Minneapolis-St. Paul) sales office.

Hellyar started with the plastics division in 1938, was appointed a sales correspondent in the sales department in 1941, was made a sales representative in the New York area in 1945, and in October, 1951, assistant sales manager for plastic sheet products in Springfield.

John M. Cochran is now Monsanto's technical sales representative for surface coating resins in the plastics division's Chicago sales district.



New Million-Dollar Plant of Yale Rubber Mfg. Co., Sandusky, Mich.

Yale Rubber Opens New Plant

Yale Rubber Mfg. Co., Sandusky, Mich., maker of specialized precision rubbber products for industrial use, will begin operations on October 1 in its new million-dollar plant which will more than double the firm's previous production capacity. According to the company president, E. H. Henderson, construction of the 85,000-square foot plant was a major phase of an overall program to expand, improve, and streamline the firm's operations in molding, stamping, extruding, and calendering rubber products.

Designed and built by Giffels & Vallet, Inc., Detroit, Mich., the new plant permits all production operations to be completed in one building.

Bullet-Sealing Fuel Cells for Ground Vehicles

Bullet-sealing fuel cells, previously used in airplanes, have now been adapted successfully to ground and amphibious vehicles by Firestone Tire & Rubber Co., Akron, O. The new Army Otter, an amphibian cargo tractor, is being equipped with Firestone safety cells. Replacing metal units, the twin rubber gasoline cells provide a double safety factor; in addition to sealing bullet holes, the rubber absorbs jolts, jars and twisting stresses and strains without breaking open at the seams, it is claimed.

New Battery Sold in East

The Firestone Dri-Charged battery, a new storage battery that can be made, shipped, and warehoused in a dry state,[1] was introduced in the East last month. To launch the sales program Firestone held a luncheon for some of its metropolitan New York dealers on August 14 at the Henry Hudson Hotel. The luncheon included a discussion and demonstration of the new battery, as well as a question and answer period. First announced during the spring, the Dri-Charged battery was previously sold only in the Cleveland, O., area because of limited production. It will be given nationwide distribution within the year.

[1] See our June, 1952, issue, p. 399.

E. H. MacNiece, director of quality control for Johnson & Johnson, New Brunswick, N. J., was made chairman of the new industry-university committee for quality control at Rutgers University, New Brunswick.

Calrod Heaters for O-Ring Presses

General Electric Co., Schenectady 5, N. Y., has announced that 1,400 of its high-temperature tubular Calrod heaters keep a battery of 24 hydraulic molding presses in continuous operation at Precision Rubber Products Corp., Dayton, O. These presses are used for molding hydraulic O-rings used in automobiles, trucks, aircraft, and farm machinery. Precision Rubber uses a number of 675-, 250-, and 75-ton presses of the four-opening type. These presses operate at 300° F. and produce several million O-rings per month. Straight lengths of the G-E heaters are set parallel in the press grids to provide uniform heat throughout the molding operation.

Molded Rings for Brake Motors

Collector rings for brake motors are now being molded from a rubber-phenolic compound made by G-E's chemical division, Pittsfield, Mass. The previous method of using brass slip rings shrunken on a laminated tube was costly and did not provide an adequate barrier against current creepage. Phenolic moldings with brass rings as inserts were tried, but cracked because of the varying shrinkage coefficient between the two materials. Because of the high internal resiliency of the rubber-phenolic compound G-E 12487, the assembly is now being produced by further compressing the brass rings into the part after molding. The rings are being molded by Rockford Molded Products Co. for the Warner Electric Brake & Clutch Co.

Truck Tire Prices Down

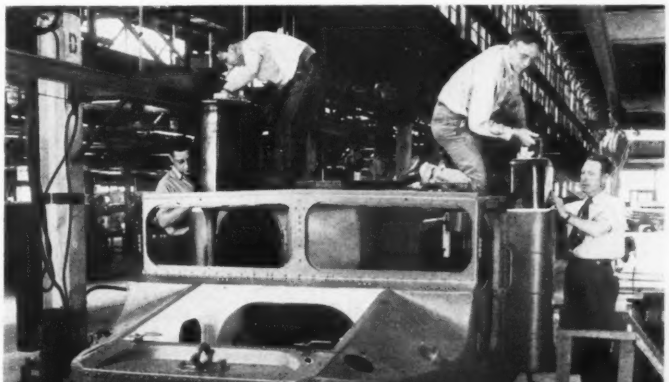
A reduction of approximately 6.5% in the price of truck tires 10-ply and larger in size was announced by Goodyear Tire & Rubber Co. and Seiberling Rubber Co., both of Akron, O. These tires are used on the larger types of on- and off-the-road vehicles. The price cut was said to have been made possible by lower natural rubber market prices.

Similar price reductions for these large-size truck tries were also reported in late July and during August by Lee Rubber & Tire Corp., Firestone Tire & Rubber Co., The B. F. Goodrich Co., and Mohawk Rubber Co. Most of the other major tire producers are expected to follow suit if they have not already done so.

New Raybestos Warehouses

Raybestos-Manhattan, Inc., Passaic, N. J., has opened a new Houston, Tex., warehouse at 3012 Canal St., which offers larger quarters with ample stocking facilities for servicing the expanding Gulf Coast industrial area. This warehouse will supplement and service distributors' stocks and will permit prompt service and deliveries. The principal products carried will be conveyor belting, transmission belting, V-belts, industrial hose of all types, and asbestos and rubber packings. The Houston warehouse, in charge of M. C. Nugent, operates under the Dallas office, E. W. Nagel, manager.

Raybestos, on August 15., opened another new warehouse, this one at 4500 York St., Denver, Colo., in the charge of Elton T. Fair, Jr., sales representative for the territory, which includes the entire Rocky Mountain region. The newly erected building has modern office and warehouse facilities to handle all mechanical rubber goods but especially for the oil field trade.



Army Otter Being Equipped with Firestone Fuel Cells at a Pontiac Plant

Carl J. Wright

Carl Wright Retires

Godfrey L. Cabot, Inc., Boston, Mass., last month announced the retirement of Carl J. Wright as vice president and general manager of General Atlas Carbon Co., a subsidiary in Pampa, Tex. Mr Wright, however, will continue in a consulting capacity with Cabot.

Mr. Wright, a pioneer in the development of a furnace burner for the production of carbon black in 1927 built the first carbon black plant to utilize this burner. In 1945 Cabot purchased this plant, a second plant built in 1939, and assets of General Atlas, and Mr. Wright, a vice president of the company, retained his position of vice president and general manager under Cabot ownership.

The career of Carl J. Wright includes 27 years of service to the carbon black industry. He was graduated from Rensselaer Polytechnic Institute, where he received his B.S. degree in Electrical Engineering, and joined Denver Gas & Electric Co., a subsidiary of Cities Service Co., as a junior engineer. In 1917 he was transferred to Toledo, O., to the industrial heating department of Henry L. Doherty & Co. In 1922 he became head of the research division of Combustion Utilities Corp. and undertook special research with the late Henry L. Doherty, then president of Cities Service.

A testimonial was tendered Mr. Wright recently at the Pampa Country Club in recognition of his fine record of service with the Cabot organization.

Shortly afterward Mr. and Mrs. Wright left for their new home at Fort Collins, Colo.

Guayule Sales Off

Intercontinental Rubber Co., Inc., 50 Broad St., New York, N. Y., in its recent semi-annual report to shareholders announced that owing to the very ample supplies of synthetic and natural rubber, particularly in the secondary grades of the latter, sales of guayule rubber have declined very sharply. During the last three months of the company's operation, output greatly exceeded sales.

Intercontinental found it advisable to discontinue the production of guayule rubber, on May 14, at its Torreon plant in Mexico. During the weeks of operation this year 1,646,300 pounds of rubber were produced. Lower selling prices and onstantly increasing costs made operations unprofitable, especially since it became necessary to go long distances to harvest scattered stands of shrub to secure a sufficient supply for reasonable milling operations. It is also belived that several years of favorable weather will be required before a good supply of shrub can be obtained in normal cutting areas.

Liquidation of the company's plant in Cedros, Mexico, now in progress, should be completed by the year-end.

Intercontinental further reports that since the recovery of its plantation in Sumatra in 1948 about one-third of the acreage originally planted to rubber has been reclaimed and brought back under cultivation, but the company does not feel it economically feasible to proceed with a reclamation program in the remaining area because of the age of the trees and the cost of clearing and cultivation. Some rubber, though is harvested in these abandoned areas by natives on a contract basis.

The company then considered a planting program and actually has a small experimental nursery of the newer high-yielding varieties of rubber trees. No further action has been taken on this program, however, owing to the unsettled conditions in Indonesia and the competitive position that may face natural rubber in the future.

Forms West Coast Sales District

The formation by The Goodyear Tire & Rubber Co., Akron, O., of a new sales district on the West Coast was announced last month by Victor Holt, Jr., vice president in charge of tire sales. Effective September 1, the previous Los Angeles district was divided into two parts: the Los Angeles district and the new Southern California district. C. A. Crafts, former manager of the Los Angeles district continues in that capacity; while B. J. Keenan becomes manager of the new district. Both districts will be headquartered in the new office and warehouse building at 6666 Washington Blvd., Los Angeles, Calif.

"Moving Sidewalk" Tested

Goodyear belting engineers have designed and built a "moving sidewalk" that has been subjected to more than a thousand tests transporting hundreds of persons. Built specifically to record data for final engineering plans on the high-speed conveyor-belt subway system proposed by Goodyear and Stephens-Adamson Mfg. Co. for New York, N. Y. the 68-foot passenger conveyor has passed all its tests during a year of continuous experimentation. Tests were made with women wearing all types of shoes, small children both with and without adult guidance, and persons with leg handicaps.

Whiting N. Shepard has been named director of sales for Boston Woven Hose & Rubber Co., Cambridge, Mass. Mr. Shepard joined the company in February, 1952, as head of plastics sales after having spent 19 years with the Plaskon division of Libbey-Owens-Ford Glass Co.

Changes at Seiberling

Walter T. Johnson becomes assistant general sales manager for Seiberling Rubber Co., Akron, O., on September 15 and will assist C. A. Reed, general sales manager. The position is a new one.

To replace Johnson as Atlanta district manager, a position he has held since 1943, the company has transferred his brother, Ralph C. Johnson, a truck tire sales representative in the company's Dallas district, to Atlanta.

George Rice, sales representative in the Atlanta territory, has been named assistant district manager in Atlanta, also a new position.

To succeed Ralph Johnson in Dallas, Seiberling named Herndon S. Howard, a sales representative there, to the truck tire sales post.

Walter Johnson, a 25-year Seiberling employe, started as a salesman for the company in Arkansas and was district manager at Buffalo, N. Y., and Boston, Mass., before transferring to Atlanta.

Ralph Johnson joined the company in 1945 after past tire sales experience and has served as a salesman for the company in Detroit and Dallas.

Rice began with Seiberling in 1928, left for a short time during World War II to be a tire dealer, but rejoined the company.

Howard is a past fleet supervisor for a large truck freight line in Texas.

Industrial Safety Equipment Assn., Inc., 420 Lexington Ave., New York 17, N. Y., recently held its annual meeting at Hot Springs, Va., at which the following officers were elected: president, Edison L. Wheeler, of Wheeler Protective Apparel, Inc.; vice president, S. C. Herbine, Willson Products, Inc.; trustees, J. B Davies, Mine Safety Appliances Co., and F. R. Davis, Jr., Davis Emergency Equipment Co. Other board members include J. A. Brewer, Industrial Gloves Co., G. M. Glidden, Acme Protection Equipment Co, and Chas. H. Gallaway, American Optical Co. Mr. Gallaway, past president of ISEA, is also a director of the National Safety Council and will act as liaison between the two organizations.

Volunteers Used to Test Goodyear's Experimental Passenger Conveyor

OBITUARY

George W. Stephens

GEORGE W. STEPHENS, chairman of the board of directors of The Mansfield Tire & Rubber Co., Mansfield, O., suffered a fatal heart attack August 12 while vacationing at his summer home at Chaska Beach on Lake Erie.

Mr. Stephens was born in Washburn, Ill., May 9, 1880.

As a young man, the deceased was a school teacher who studied telegraphy in his spare hours, acting as telegrapher in a railroad station at Wasburn. Later on he studied bookkeeping and business administration.

His career in the tire industry began in 1903, when he worked for the G & J Tire Co. in Chicago. In 1913 he became associated with the Mansfield company. In 1919 he was elected vice president and general manager of the company; president, in 1923; and on January 1, 1949, chairman of the board.

A civic leader who gave much of his time and resources for the betterment of Mansfield, George Stephens was also one of the most active supporters of the Mansfield Chamber of Commerce, having served as its president in 1930 and also as a director for many years. He was former president of the Mansfield Manufacturers' Club and was one of the founders and the lifetime president of the Richland County Foundation, an organization which raises funds for worthwhile civic causes, particularly youth and character building agencies.

Surviving Mr. Stephens are the widow, a son, a daughter, one sister, five brothers, and five grandchildren.

Funeral services were held at his family home in Mansfield, August 15.

Walter A. Schulze

WALTER A. SCHULZE, a member of the research planning board of Phillips Petroleum Co., Bartlesville, Okla., died there on July 30, following a short illness. Funeral services were held in Bartlesville on August 1.

Mr. Schulze was born 52 years ago in Steelville, Ill. He attended elementary schools in Carlsbad, Tex., and in 1925 was graduated from the University of Texas; later on he did graduate work both there and at the University of California.

He joined Phillips in 1929, shortly after became chief chemist, and from 1945 to 1950 was assistant director of the chemicals division of the research and development department.

As the author of many technical papers pertaining to the petroleum and chemical industries, Walter Schulze contributed greatly to the development of many processes in widespread use today and was the holder of more than 200 patents both in the United States and foreign countries.

The deceased was a member of the American Chemical Society, Phi Beta Kappa, Tau Beta Pi, Sigma Xi, and Phi Lambda Upsilon.

Survivors include the widow, his mother, a brother, two sisters, and several nieces and nephews.

A memorial fund has been established, probably to be used for medical research.

David M. Sellew

DAVID M. SELLEW, vice president and general manager of Auburn Rubber Co., Auburn, Ind., died of a malignant brain tumor, July 29.

The deceased was born in Galesburg, Ill., December 22, 1905. He attended the local high school; Selig Institute, Vevey, Switzerland; Moses Brown Preparatory School, Providence, R. I.; and Bowdoin College, from which he was graduated with a B.S. in chemistry in 1927. He then did post-graduate work at Akron University, majoring in rubber chemistry.

Mr. Sellew first was employed as a chemist by Goodyear Tire & Rubber Co., Akron. He resigned in 1929 to become purchasing agent for Auburn Rubber, where he was advanced to chief chemist and plant superintendent and, in 1940, to vice president and general manager.

During World War II he served in an advisory capacity to the WPB rubber division and was also on the national panel of arbitration of the American Arbitration Association.

An enthusiastic participant in civic affairs, Mr. Sellew was for four years chairman of the DeKalb county unit of the American Cancer Society, a trustee of the Auburn Presbyterian Church, a director of the Auburn Y.M.C.A., a senior adviser to the Hi-Y Club, and active in the Presbyterian Men's Fellowship. He was also a member and a past president of the Auburn Rotary Club, a member and a director of the Toy Manufacturers Association of America, and a member of the Chicago Rubber & Plastics Institute, American Chemical Society, Auburn Chamber of Commerce, Auburn Rod & Gun Club, Alpha Delta Phi, and various Masonic bodies.

Funeral services were held August 1 in the Auburn Presbyterian Church, followed by Masonic services at the graveside in Woodlawn Cemetery.

Survivors include the widow and two daughters.

F. A. Abbiati

F. A. ABBIATI, general manager, plastics division, and a vice president of Monsanto Chemical Co., Springfield, Mass., succumbed to a heart attack August 13 in a Boston hospital, after having been confined there 21 days.

Born in Barre, Vt., 47 years ago, Mr. Abbiati attended public schools there and received a B.S. degree in chemistry from the University of New Hampshire.

After graduation from college in 1927, Mr. Abbiati entered Monsanto's Merrimac Division, where he remained until 1938, at which time he was transferred to the plastics division at Springfield as sales manager for Vuepak. In June, 1939, he became assistant general manager of sales; general manager of sales in February, 1944; assistant general manager, in May, 1947; and general manager in October, 1950. In November, 1951, he was elected to the position of vice president.

The deceased was a member of the American Chemical Society, the Masons, the Longmeadow Country Club, and the Springfield Chamber of Commerce.

He is survived by the widow, one son, and a daughter.

Funeral services were held August 15 at the Byron Funeral Home in Springfield, followed by burial in the cemetery at Longmeadow, Mass., where he lived.

Stephen P. Turke

STEPHEN P. TURKE, general manager of The Davidson Rubber Co., Charlestown, Mass., died July 2 in a Massachusetts hospital at the age of 38.

A graduate of the Bentley School of Accounting & Finance, Mr. Turke also attended the Boston University School of Business Administration. From 1939 to 1949 he held various administrative positions with Cambridge Rubber Co.

The deceased belonged to The Rubber Manufacturers Association, Inc., American Chemical Society, and American Management Association and was at one time director of the Cambridge Chamber of Commerce.

Surviving are his wife, a son, and a daughter.

Funeral services took place July 5 in St. Mary of the Hills Church, Milton, Mass.

Byron V. Crane

A HEART attack on a vacation trip caused the sudden death, on June 20, at High Prairie, Canada, of Byron V. Crane, one-time assistant editor of India Rubber World. Requiem Mass was sung at St. Mary's Church, Greenwich, Conn., followed by interment in St. Mary's Cemetery, on June 30.

Byron Crane was born in Peoria, Ill., on August 4, 1907. He attended local grade and high schools and the University of Wisconsin, from which he was graduated with a B.A. degree in 1934.

He then found employment in Washington, D. C. with the Federal Writers Project. In 1936 he transferred to Montana as state director of the Project there. In this capacity he was co-author of "The Montana Guide Book." He left Montana in 1942 to become assistant editor of India Rubber World, a position he held until 1945, except for the period September, 1942-April, 1944, when he served in the U. S. Army Air Corps. Crane's next job was as chemical editor of *The Journal of Commerce,* also in New York.

He resigned in September, 1949, to devote himself to free-lance writing, making his home in Priest Lake, Idaho. On April 1, 1951, however, the deceased became the owner and editor of the weekly newspaper, *The Mullan News,* of Mullan, Idaho.

Mr. Crane also belonged to the Elks Club of Mullan.

He leaves a brother and a sister, to whom the sympathy of those who knew him in our organization and in the trade is extended.

John G. Barr

JOHN GORDON BARR, 61, manager of tire sales for the western Quebec division of Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., died suddenly August 18.

Mr. Barr was born and educated in Granby, P.Q. He went to Montreal as a youth and worked for Goodyear there a little less than 40 years.

Active in charitable organizations, the deceased was a member of Karnak Temple, and also of the Marlborough Golf and the St. Denis clubs.

He leaves his wife and three sons.

NEWS ABOUT PEOPLE

Theodore C. Kiesel, P. O. Box 93, Pleasant Ridge Sta., Cincinnati 13, O., has been appointed by Godfrey L. Cabot, Inc., Boston, Mass., carbon black manufacturing firm, exclusive agent for the sale of Cabot carbon blacks to the paint, ink, plastics, and related industries in the southern and central Ohio, southern Indiana, and northern Kentucky area. Mr. Kiesel has been active in the pigment field since his graduation from college in 1924, serving color companies in this same area during the past six years.

Col. Max F. Moyer, of the Air Force Reserve, returned August 18 to Goodyear Tire & Rubber Co., Akron, O., to resume his duties as manager of cycle tire sales after nearly four months' active duty with the Air Command and Staff School at Maxwell Air Base, Montgomery, Ala.

Donald R. Guthrie has been appointed executive engineer in charge of engineering by Minnesota Mining & Mfg. Co., St. Paul, Minn., and will organize an engineering research group consisting of three sections: chemical engineering, machine development, and instrument engineering. The purpose of this new group will be to provide specialized engineering assistance to engineers in the company's various product divisions. Guthrie joined 3M as a research chemist in 1939 and was made a division engineer in 1944.

Robert A. McLaughlin has been appointed director of sales for Pittsburgh Plate Glass Co.'s new fiber glass division. Associated with the company's merchandising division since 1940, Mr. McLaughlin had served as a sales representative at the Chicago, Ill., warehouse and as manager of the firm's Columbia, S. C., branch. During the past five years he was manager of the rapidly expanding Mineola, N. Y., warehouse. Production facilities for the production of strand and super-fine fiber glass are currently being installed at the firm's Shelbyville, Ind., plant. Initial production will commence late this year.

Elmer Borsuk and **Manny Mighdoll** have been appointed trade relations director and public relations director, respectively, of National Association of Waste Material Dealers, Inc., 71 Madison Ave., New York 16, N. Y. Mr. Borsuk was in charge of public relations for the Military Sea Transportation Service in New York since October, 1950; while Mr. Mighdoll was assistant public relations director of NAWMD since December, 1951.

W. S. Richardson, Goodrich vice president, has been elected vice president of the Manufacturing Chemists Association. He has been a member of its directorate for several years. Richardson, with Goodrich since 1926, became president of B. F. Goodrich Chemical Co. when it was organized in April, 1945, and last April was named vice president of the parent company. During World War II he was chairman of the OPA Mechanical Rubber Goods Industry Advisory Committee.

John Crowther

John Crowther has been appointed assistant sales manager of Stauffer Chemical Co., New York, N. Y. He has been with the company seven years and was director of eastern division research, with headquarters at Chauncey, N. Y. Prior to his war service Mr. Crowther was with M. W. Kellogg Co.

Lombardi

Frank T. Eaton

Frank T. Eaton has been appointed Solka-Floc sales representative of the pulp division of Brown Co., with headquarters at 150 Causeway St., Boston, Mass. For the past five years Mr. Eaton was assistant market analyst of the company. Prior to his war service he had been with Allied Chemical & Dye Corp.

Edward Lebo has been appointed public relations director of Hewitt-Robins, Inc., Stamford, Conn. He was formerly assistant director of public relations of United States Rubber Co. and prior to that had worked on newspapers in Somerset, Pa., and Poughkeepsie, N. Y.

Wesley S. Coe has been appointed assistant factory manager of the Naugatuck, Conn., plant of Naugatuck Chemical Division, United States Rubber Co. Dr. Coe joined the company at its general laboratories in Passaic, N. J., in 1936, transferred to Naugatuck Chemical in 1937, served in the research and development department as senior section leader in process development, and most recently was chemical production superintendent and assistant to the factory manager.

Herbert Scullin has been named to succeed Dr. Coe as chemical production superintendent. Mr. Scullin started with Naugatuck Chemical in 1935 and served successively as foreman, general foreman, assistant superintendent in the chemical production department and labor relations supervisor in the industrial relations department.

R. A. Hoekelman has been made assistant general manager of the plastics and resins division, American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. Mr. Hoekelman joined Cyanamid in 1930 and served in the accounting and credit departments until 1934, when he resigned to become associated with Maywood Chemical Works. In 1941 he rejoined Cyanamid, where in recent years he has been assistant treasurer and comptroller. Prior to his association with Cyanamid, Mr. Hoekelman was employed in the banking field and with A. Klipstein & Co.

J. M. Selden has been appointed manager of the eastern division of Shell Chemical Corp., 50 W. 50th St., New York 20, N. Y. He has been associated with the marketing of Shell Chemical products since 1933, first as vice president and director of R W. Greeff & Co., agent until 1946 for the sale of Shell Chemical products east of the Rockies, and then as sales manager of the chemical firm's eastern division. As sales manager of this division, Selden saw its five subsidiary district sales offices grow to nine, and he has been instrumental in the successful marketing of important new additions to the company's solvents, industrial chemicals, and resins and plastics, such as synthetic glycerine and ethyl alcohol, both made by exclusive processes from petroleum raw materials, and Epon® resins, a new type of resin with wide application in surface coatings. In his new position Selden will continue to administer sales activities based on these established products and others such as Shell Chemicals solvent alcohols and ketones, intermediates useful in making other chemicals, and specialty products such as oil additives, as well as to assume a chief part in the introduction of new products, still under development, to eastern chemical markets.

Robert W. Van Sickle has been named head of the heat fabrication section, The Dow Chemical Co., Midland, Mich., to replace **L. H. Stewart**, transferring to the company's atomic energy plant in Colorado. Van Sickle has been a member of the injection molding section of plastics technical service since 1948 and prior to that time worked in the cellulose products department for three years.

CALENDER IGNORES THE CALENDAR

Gage stays accurate with calender rolls on TIMKEN® bearings

GAGE of plastic film and rubber sheeting stays accurate longer when calender rolls are mounted on Timken® tapered roller bearings instead of sleeve-type bearings.

Timken bearings hold rolls in accurate alignment. Uniform gage is maintained for the length of the sheet and for sheet after sheet. And your yield is increased because Timken bearings hold gage to minimum tolerances. You get more yards per pound of material.

Roll neck wear is eliminated with Timken bearings because there is no friction between roll neck and bearing. Overhauls are fewer. Downtime is minimized because roll necks don't need to be machined.

Timken bearings have true rolling motion and incredibly smooth surface finish which practically eliminate wear within the bearing. Precision is *maintained.*

Timken bearings are tapered in construction permitting them to take radial and thrust loads in any combination. And because of line contact between their rollers and races, there's load capacity to spare.

Take advantage of Timken bearings in your calenders, mills, refiners and mixers. For full information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

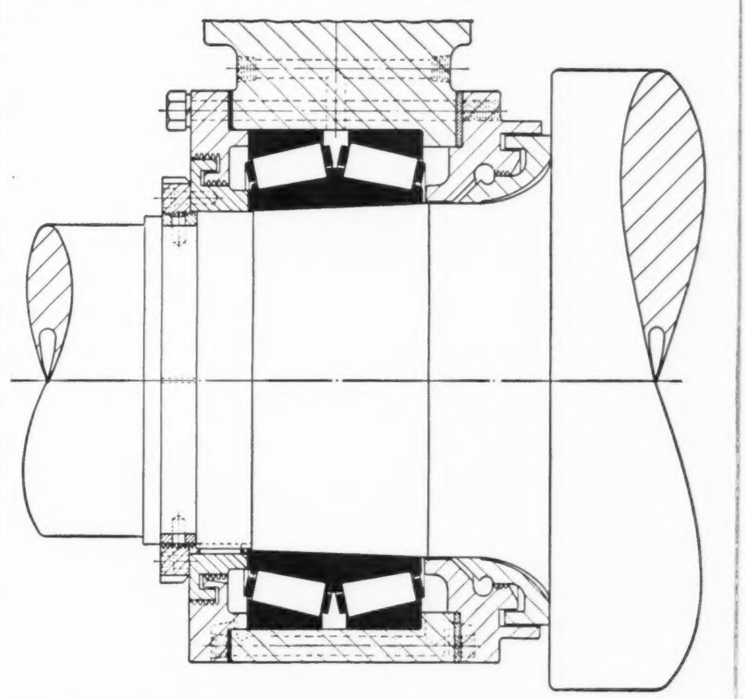
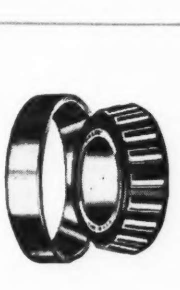


Diagram shows how calender rolls are mounted on Timken tapered roller bearings to maintain uniform gage of plastic film and rubber sheeting.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

Elmer F. Myers, sales engineer, has been transferred by Farrel-Birmingham Co., Inc., Ansonia, Conn., to Fayetteville, N. C. Mr. Myers, who has been covering the New England territory from the Ansonia office, will now handle the sale of the company's machinery in Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, and Alabama. Mr. Myers joined Farrel-Birmingham in 1946.

B. L. Hathorne has joined Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y., as assistant to the vice president in charge of development and will devote his time to Glyco's expanding activities, with particular emphasis in the development of new products. Mr. Hathorne recently resigned as manager of the auxiliary products division of Geigy Co. and previously had been a consultant to the textile industry.

Robert H. Poulton last month was named representative-technical sales of Flexible Tubing Corp., Guilford, Conn., and will assist W. L. Guiles, manager-technical sales, rendering engineering assistance to the aircraft industry and other original equipment manufacturers. Mr. Poulton joined the company in May, 1951, as a production worker in the Flexflyte department. In just one year he has progressed through the job of chief inspector to his present assignment.

Arnold Kneitel has been added to the sales staff of Bishop Mfg. Corp., Cedar Grove, N. J. Specializing in silicone products, Mr. Kneitel will supervise sales engineering activities as they relate to silicone and other types of specialty electrical insulation manufactured by Bishop, and he will be primarily concerned with the development of new applications for the company's products. For the past five years he was with General Electric Co.

Howard R. Gaetz has been appointed factory manager of the Kankakee Unit, Joliet Arsenal, operated by Naugatuck Chemical Division, United States Rubber Co., Rockefeller Center, New York, N. Y., for the United States Government. He replaces John E. Helquist, transferred to the Division's Painesville, O., plant, as plant engineer in charge of its expansion program. Mr. Gaetz came to U. S. Rubber in 1942 with 10 years of chemical engineering experience both in the United States and abroad. His first position with the rubber company was production superintendent of the Pennsylvania Ordnance Works. He also served as production superintendent of the Kankakee Ordnance Works and the Institute, W. Va., GR-S synthetic rubber plant during World War II. In 1945 he was appointed factory manager of the Naugatuck, Conn., GR-S synthetic rubber plant. In 1949, Mr. Gaetz accepted an assignment with the Economic Administration in Korea, and when the war broke out there, he returned to Naugatauck Chemical as production superintendent of the Kankakee Unit.

C. R. Webster has joined the special products section of plastics technical service, The Dow Chemical Co., Midland, Mich., and will handle technical service work on polyvinyl chloride.

Charles H. Brook, comptroller of the Goodyear Tire & Rubber Co. for 31 years, is resigning for reasons of health and will be succeeded by **Harry W. Hillman**, assistant treasurer.

John S. Lowry, formerly general foreman of the mat division of Seiberling Rubber Co., has been appointed factory manager of Ace Rubber Products, Inc., Akron, O.

Frank O. Holmes has joined Armstrong Tire & Rubber Co., Natchez, Miss., as technical director. He had previously been associated with Goodyear Tire & Rubber Co. as development manager in Sweden and also was chairman of the Swedish Institution of Rubber Technology.

Alfred H. Lincoln has resigned from Tillotson Rubber Co. to become chief chemist of The Granet Corp., manufacturer of latex products, Framingham, Mass.

Earl Noyes, formerly with Arrowhead Rubber Co., is now sales Manager for Plastic & Rubber Products Co., 2100 Hyde Park Blvd., Los Angeles 47, Calif.

CANADA

To Build Canadian Plant

An expansion program of approximately $450,000 for Taylor Instrument Cos. of Canada, Ltd., has been announced by Herbert J. Noble, president of the Canadian firm and executive vice president and treasurer of Taylor Instrument Cos., Rochester 1, N. Y. A new factory site in Toronto, Ont., has been purchased, and contracts let for the erection of a single-story plant with an area of 40,000 square feet. The space will be utilized both as an office and for manufacturing the firm's industrial, medical, and household instruments.

Canada Wire & Cable Co., Ltd., Leaside, Ont., according to President James Y. Murdoch, in his recent semi-annual report, in April started production of aluminum sheathed cable, one of the first companies to do so, and output has been since maintained on a two-shift basis. The company has also completed a new factory building for the bare wire departments, and necessary equipment is being installed.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., has announced that its vice president and general manager, D. B. Collett, has been appointed an executive director of Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham, England, and will leave for the United Kingdom the latter part of this year. Mr. Collett will continue also as a member of the board of the Canadian company, where his successor will be J. P. Anderson, chief purchasing agent of the parent company in England.

FINANCIAL

Belden Mfg. Co., Chicago, Ill. First half, 1952: net income, $441,902, equal to $1.37 a share, compared with $620,981, or $1.93 a share, a year earlier.

Canada Wire & Cable Co., Ltd., Leaside, Ont. Initial half, 1952: net profit, $1,022,000, equal to $5.34 a share, against $1,282,000 or $6.29 a share, a year earlier.

Philip Carey Mfg. Co., Cincinnati, O. June half, 1952: net earnings, $856,790, equal to $1.02 a share, contrasted with $1,702,756, or $2.07 a share, a year earlier.

Columbian Carbon Co., New York, N. Y. First half, 1952: net income, $2,127,-847, equal to $1.32 a share, against $2,823,-275, or $1.75 a share, a year earlier.

New Jersey Zinc Co., New York, N. Y., and subsidiaries. Six months to June 30: net earnings, $5,250,473, equal to $2.68 each on 1,960,000 capital shares, against $5,129,894, or $2.62 a share, a year earlier.

Seiberling Rubber Co., Akron, O., and subsidiaries. Six months to June 30: net income, $437,137, equal to $1.09 each on 301,010 common shares, compared with $675,427, or $1.86 a share, in the 1952 months; net sales, $19,641,935, against $22,123,570.

Union Asbestos & Rubber Co., Chicago, Ill. Six months ended June 30: net profit, $387,078, equal to 81¢ a share, against $377,420, or 79¢ a share, in the like period last year.

United Carbon Co., Charleston, W. Va. Initial half, 1952: net income, $1,749,355, equal to $2.20 a share, against $1,829,724, or $2.30 a share, in the 1951 half.

(Dividends on page 840)

Mattress Standard

(Continued from page 788)

users of foam mattresses; promoting fair competition and consumer confidence in products conforming to the standard; and providing a basis for labeling and guaranteeing the quality of the product. Copies of the standard may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at a cost of 5¢ a copy.

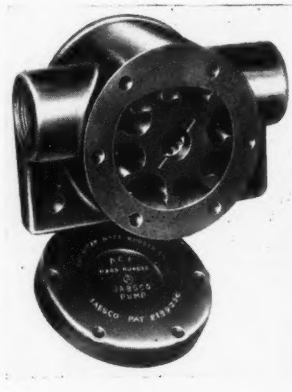
Akron Section Election

THE Akron Section of the American Chemical Society at a recently held meeting elected J. D. D'Ianni, Goodyear Tire & Rubber Co., chairman for the 1952-53 term; W. G. Mayes, Firestone Tire & Rubber Co., chairman-elect; T. L. Greshman, The B. F. Goodrich Co., secretary; and J. T. Gregory, also Goodrich, treasurer.

New Machinery

Hard Rubber Pump

THE patented Jabsco pexible neoprene impeller pump is now being manufactured in hard rubber construction for handling acids, alkalies, and other corrosives by the American Hard Rubber Co., New York, N. Y. Top-quality Ace hard rubber is used in the molded pump casing, cover plate, gland parts, and drip pan. The pump base is cast-iron coated with acid resistant paint; mounting bolts and studs are stainless steel; and the shaft, impeller insert, and key are all made of Hastelloy C.


Ace Hard Rubber Jabsco Pump with Cover off to Show Impeller

Although nominally only ¾-inch in size, the pump has a maximum capacity of 16 gallons per minute or a 95-foot head. Suitable for handling thin or viscous liquids, the pump delivers 15 gallons per minute at a 22-foot head, and five gallons per minute at a 72-foot head. The Ace Jabsco pump is self-priming; starts instantly against suction lifts of six feet without a foot valve; and, when primed, handles suction lifts as high as 14 feet. The self-lubricated flexible neoprene impeller is said to outlast conventional metal rotors and gears; is self-compensating for wear; and is quickly replaceable by removing the cover plate. The pump is threaded for connection to ¾-inch standard pipe, operates for either standard or reverse flow, and is furnished with a ½-hp. motor.

New Manual Press

THE new Model P-6612 press, made by Harco Industries, Inc. Rochester, N. Y., provides all-purpose pressure from 0-12 tons for laboratory, production, or home workshop use. Applications of the machine include embossing, laminating, rubber curing, pressure gluing, press-fitting parts, die testing, and duplicating die parts. Only 23 inches high, the new press requires little operating space. The moving platen is six inches square, and the strain rods are eight inches apart. Normal die space is eight inches, but additional height can be provided.

An automatic platen arm moves the lower platen into pressure position with a single stroke, thus eliminating tedious pumping to close the die space. Pressure cycles are accurately measured

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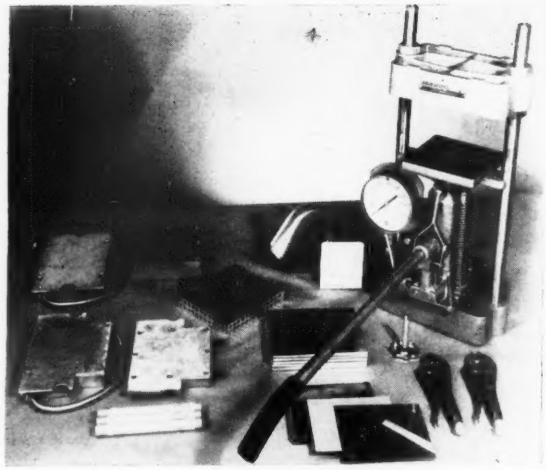
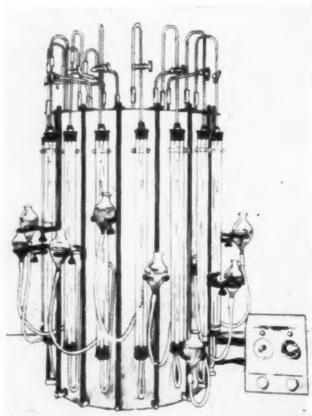


Harco Press Model P-6612 with Platens and Accessories

by a timer calibrated in 15-second intervals up to 15 minutes. Water or air cooled platens are furnished to cool the material while under pressure. The heating platens, furthermore, have been designed for maximum heat transfer in minimum heating time.

Oxidation Unit



GFB-JRS Oxidation Unit for Rubber and Plastics

THE GFB-JRS oxidation unit for the precise determination of the amount of oxygen absorbed by rubber, plastics, fibers, and other materials subject to deterioration by exposure to air or oxygen has been announced by G. F. Bush Associates, Princeton, N. J. The design of the unit is based on the volumetric oxygen absorption method developed by J. R. Shelton, Case Institute of Technology, for oxidation and aging studies on rubber and related materials. The equipment can also be used to determine absorption upon exposure to other appropriate atmospheres and as a heating unit for the test-tube aging procedure which is given in ASTM D866-48T.

The unit has 14 individual sample tubes, each with its own gas buret and leveling bulb. The tubes are arranged uniformly in a circular aluminum block which has a thermostatically controlled heating unit at its center. The volume of gas absorbed (or generated) in the reaction tubes is accurately measured in the water jacketed burets. Pressure is controlled by adjusting the leveling bulbs, which contain mercury as the confining fluid. The 14 tubes may be loaded with either identical or different materials, and the specimens can be removed for physical testing after absorbing specified amounts of oxygen.

Temperature is controlled up to 200° C., with an accuracy of ±0.1° C. Volume control is from 0-100 milliliters for each charge of gas, with a sensitivity of ±0.1 milliliter. Pressure is maintained by periodic micrometric manual adjustments. The valving scheme permits refilling the tubes so that the amount of gas which may be measured is not limited by the size of the tubes. Other features include simple operation with accessible specimen tubes; buret gas volume visible at all times; fine adjustment on leveling bulbs; gas-tight system; and controls in separate box with pilot lights. The unit is 45 inches high, 32 inches in outside diameter, and weighs 200 pounds. Modifications include different numbers of tube chambers and use of another type of valving system.

New Materials

New Chemigum Nitrile Latices

PRODUCTION of two new Chemigum latices, 235BHS and 245CHS, of special interest to paper and textile converters and other chemical processers, has been announced by Goodyear Tire & Rubber Co.'s chemical division. The new 235BHS adds a high solids, minimum stabilized latex to the 235 series of butadiene-acrylonitrile copolymer latices; while the new 245CHS adds a high solids, anionic stabilized copolymer latex to the 245 series.

Requirements of the paper and textile converters can now be met with a Chemigum latex tailored for their particular needs because of availability of three different stabilization systems, ammonia soap, synthetic anionic, and minimum stabilization in both medium and high acrylonitrile content latices, it was said.

Butadiene-acrylonitrile latices are used in the compounding of adhesives, plasticization and modification of vinyl, rubber and resinous latices, modification of asphalt emulsions, and formulation of specialty coatings as well as for coating and impregnating paper, fabric, and leather.

Staycin 1—Vinyl Stabilizer

A NEW vinyl stabilizer, Staycin 1, designed specifically for compounds which contain vegetable oil-type plasticizers, is being marketed by Baker Castor Oil Co., 120 Broadway, New York 5, N. Y. The new product is said to be the first to offer stabilization against plasticizer exudation and to extend the spew-free life of vinyl films from months to years. The stabilizer is complete in itself; no additional stabilizers or lubricants are required. Stabilization against heat and light, as well as lubrication during processing have been incorporated into Staycin 1.

The development of the new material is the result of the company's efforts to improve the performance characteristics of its ricinoleate and acetoxystearate vinyl plasticizers. Applications for these plasticizers have been limited by their exudation tendencies. Staycin 1 is claimed to give fivefold increases in the spew-free life of polyvinyl resins plasticized by ricinoleates.

New Cellulose Flock

A NEW cellulose flock, Fairport Flock, is being offered as a low-cost, low-gravity compounding ingredient by Harwick Standard Chemical Co., Akron, O. A gray powder in appearance, the new product is easily dispersed in rubber; low volumes of flock give rapid increases in stock modulus and hardness. The material has a true specific gravity of 1.58, and a gravity by difference of 1.31 in rubber. Other properties follow: moisture content, 4% maximum; acetone extract, 1% maximum; and fiber length, 100% passes through a 60-mesh screen and 70% passes a 100-mesh screen. Fairport Flock is available in 50-pound multiwall paper bags.

Vulcan 9—New SAF Black

GODFREY L. CABOT, INC., Boston, Mass., on August 26 announced the production and commercial availability of a true Super Abrasion Furnace black called Vulcan 9. An oil furnace black, Vulcan 9 is said to give 40% better wear than standard HAF, and higher tensile strength than other standard types of furnace black.

"Gen-Tac Latex." General Tire & Rubber Co., Akron, O. 8 pages. Information appears on the properties and applications of Gen-Tac Latex, a vinyl pyridine latex added to resorcinol-formaldehyde dip solutions to increase the adhesion of rubbber to rayon or nylon. Use of the latex is also said to reduce "curing blows" and give products that show fewer ply separations in service.

New Goods

Champagne Bottle Stopper

A RUBBER stopper for champagne bottles said not to leak or break is now ready to challenge the supremacy of the ordinary cork hitherto used for this purpose. According to champagne makers, thousands of dollars are lost each year through cork leakage. It is customary to store bottles horizontally to keep the cork wet and tight and reduce leakage. The new rubber stopper will remain tight, whether wet or dry, and can be used to recork the bottle for future servings without loss of champagne effervescence. The stopper is made by United States Rubber Co., New York 20, N. Y., for Robinson-Lloyds, Inc.

Rubber Stopper for Champagne Bottles Prevents Leakage

Neoprene Valve Shield

Chex-Spray Flexible Neoprene Valve Shield

A FLEXIBLE valve shield made of neoprene has been introduced by Industrial Products Co., Philadelphia, Pa., for use on valves handling acids and other hazardous chemicals. Called Chex-Spray, the shield protects the operator from injury if the valve stem packing should fail. Based on an idea originated several years ago in an E. I. du Pont de Nemours & Co., Inc., plant, the shield is molded in the shape of a flower pot. For installation, a hole of slightly smaller diameter than the valve stem is cut or punched in the bottom of the shield, the valve wheel removed, and the shield pulled down over the stem so that it covers the packing gland. The shield can be installed while the valve is in service, and the edge of the shield skirt can be trimmed to suit the contour of the valve body, if desired.

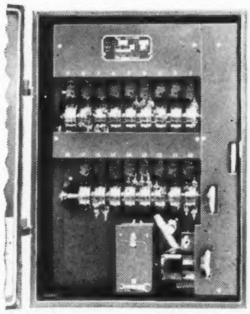
A major advantage of the shield is its flexibility which permits it to be turned back to inspect the valve or tighten the packing gland nuts. Other features include resistance of the neoprene to most acids, alkalies, and hydrocarbons as well as to weathering and aging. Shields are currently being manufactured in three sizes to accommodate valve sizes from 3/4-4 inches. Larger sizes will be made if the demand warrants their manufacture.

Goodrich Tubeless Passenger-Car Tire

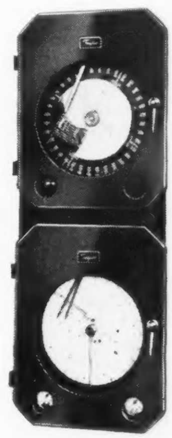
A NEW tubeless passenger-car tire, companion to the Goodrich Life-Saver Puncture-Sealing tubeless tire, has been announced by The B. F. Goodrich Co., Akron, O. The new tire, because it will not include the puncture-sealing construction of the "Grip Block" tread of the Life-Saver tire, will be priced lower when offered for sale.

The first tubeless passenger-car tire was introduced by Goodrich in 1947, and patents on its basic features were issued to the company in February, 1952.

These TAYLOR CONTROLS



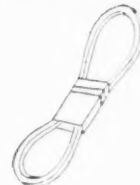
The Taylor FLEX-O-TIMER* Controller will precisely control sequence and duration of practically any operations involving temperature, pressure, or motion, pneumatically or electrically operated, or in any combination. Standard models are available with one to eighteen separate functions. Ideal for platen presses, tire presses, etc.

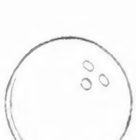


can save you money

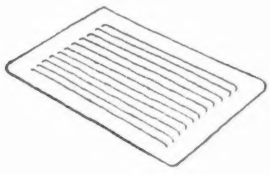
Taylor's FULSCOPE* Time-Schedule controller will repeat exactly any predetermined program involving temperature, pressure, flow or level, or any two of these. It controls rate of rise, hold periods, and rate of fall, in any desired sequence. Ideally suited for any type of vulcanizer.

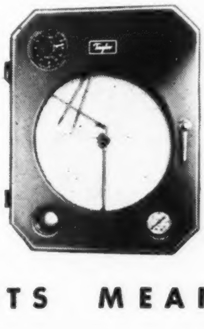
making most any Rubber Product!

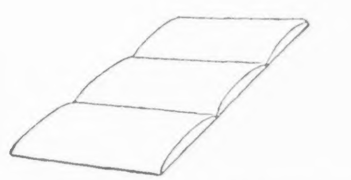




Taylor's FULSCOPE Temperature Controller with Process Timing mechanism controls temperature and curing time of cycle. Automatic timing does not start until set temperature is reached. Needs no manual attention until signal light announces completion of vulcanizing cycle. Ask your Taylor Field Engineer, or write: Taylor Instrument Companies, Rochester, N.Y., and Toronto, Canada.







Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

*Reg. U. S. Pat. Off.

TAYLOR INSTRUMENTS MEAN ACCURACY FIRST

Sealer 900 in Plastic Squeeze Bottle with Dispenser Cap

Crack-Sealing Cement

A CRACK-SEALING cement in a squeezable plastic bottle is being marketed by Marine Products, Inc., Oshkosh, Wis. Originally developed to stop leaks in small boats, the new product, Sealer 900, is useful in the home to seal cracks or open seams around sinks, tubs, shower stalls, window sashes, basements, house walls, etc. The sealer, a liquid type of synthetic rubber, is squeezed into the seams or leaky places, let dry, and then painted. The seal will not harden, crack, or contract from the sides of the seam, and is unaffected by motor vibration or physical contact, it is also claimed.

The cement is furnished in a Plaxpak polyethylene bottle, made by the Plax Corp., which is unbreakable, buoyant, and chemically inert. The container has a molded plastic cap with a tapered tip that permits the cement to be dispensed in a controlled, even flow. The cap can be unscrewed to fill the bottle. Sealer 900 will adhere to most materials, except plastics. When thinned with distilled water, it can be used to seal hair-line cracks on plaster walls.

New Electrical Tapes

A NEW line of electrical tapes has been introduced by Ideal Industries, Inc., Sycamore, Ill. The line includes a four-coated, ravel-free friction tape; a quick fusing, high dielectric strength rubber tape; and a two-in-one plastic tape. The friction tape has a tensile strength of 48-52 pounds per inch of width and is made of 60-thread cotton fabric heavily impregnated on two sides with both compound and adhesive. The specially compounded adhesive is said to retain its tackiness and sticking power for the life of the tape. The new rubber tape provides a dielectric strength of up to 18,000 volts through one thickness; fuses instantly; contains no corrosive chemicals; and is highly elastic.

The new plastic tape provides both insulation and protection against weather and mechanical abuse. The strong vinyl plastic body has a dielectric strength of more than 8,000 volts, and the special adhesive compound is anchored permanently to the plastic backing. The tape is highly resistant to aids, alkalies, corrosive salts, water, oils, greases, and alcohols; is practically impervious to weather; and retains its tackiness at low temperatures, it is also claimed. The 0.007-inch thickness of the tape plus its two-way elasticity enables it to fit snugly to irregular shapes and surfaces.

All-Wheel Transport Truck Tire

A NEW truck tire that combines better traction for driving wheels and improved non-skid characteristics for braking wheels is now available from the Firestone Tire & Rubber Co., Akron, O. The new Transport truck tire has the following special features: (1) a cord body with a 60% stronger bond between the cords and the body rubber, and a minimum of tire growth; (2) new, wider, flatter tread design with five circumferential ribs which hold their shape, resist cupping and wiping, make steering easier, and provide increased safety under all conditions; (3) new bead construction with more and stronger wire in each bead; bead bundles spread farther apart to permit more reinforcement plies around each bead and more uniform distribution of stress and greater flex resistance; (4) unusual shoulder construction consisting of a combination of smooth, flat elements designed to resist scuffing and abrasion. Deep grooves permit rapid dissipation of internal heat which builds up under heavy loads and high operating speeds.

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EUROPE

GERMANY

Growing Plastics Industry

The Technical Fair, held in Hannover from April 27 to May 6, has generally been acclaimed as the most impressive since the end of the war both as regards the variety and the quality of the exhibits shown; it provided ample proof of the speed with which German enterprise and technique are making up for lost time—also in the domain of plastics, for instance. Where Germany led here before the war, she has in recent years had to follow along paths traced by others, notably American technologists. However, the range of plastics materials and products and the number of new machines and apparatus for making and working plastics displayed in Hannover clearly proclaim that Germany is again becoming a factor to be reckoned with in the world market.

Production of plastics increased from 110,000 tons in 1949 to about 160,000 tons in 1951, and exports from 10,000 tons in 1950 to almost 26,000 tons in 1951.

A good idea of the scope and direction of German efforts in the field of plastics can be obtained from the special Technical Fair Number of *Kunststoffe*.[1] The six man groups of machinery and equipment for the plastics industry are covered; each section is introduced by a general discussion by an expert, after which follow descriptions and illustrations of equipment by leading German firms, more than 50 of whom were represented at the Fair. A rapid review of the different sections follows:

(1). *Presses, molding presses, platen presses, etc.* Hand-operated presses are still in use in many cases, but are being replaced by automatic machines; hydraulic presses take over when pressure more than 100 tons is required.

(2). *Injection molding machines.* The process of injection molding, we are told, is based on a German patent (No. 393,873) taken out in 1919; the first workable machine was built in 1921; in 1930 a machine of this type was first used in the large-scale production of polystyrene by the Badische Anilin u. Sodafabrik, Ludwigshafen, A. Rh. Since 1945 machines of this kind have again come to the fore, and many German designs are now available, it seems. The largest single piece produced here—by a specially designed injection molding machine—weighs about 4.5 kilograms (almost 10 pounds).

(3). *Screw presses, extruders,* come in a variety of sizes and for various materials. Herman Berstoff builds them with diameters up to 200 millimeters and over.

(4). *Mixing machines, sheeting machines, calenders, printing and embossing machines.* In general German calenders are designed for a top speed of about 50 m/min.; speeds of up to 200 m/min., as developed in the United States, have not yet been attained; nor are they as yet considered desirable under European conditions.

(5). *Heating devices.* High-frequency heaters have been developed in Germany since the end of the war, and *Kunststoffe* lists seven firms now manufacturing them; one firm specializing in infrared heating installations is also mentioned. Hitherto infra-red radiation has found comparatively little application in the plastics industry here, but it is being studied, and wider adoption may be expected in the future. Ultra-red radiation has as yet found little application here, but is being investigated and is apparently considered promising.

(6). *Welding devices.* Hot gas-welding apparatus is in greatest use, but in recent years welding by means of heating elements, friction welding, and more especially high-frequency welding, are gaining ground.

The German plastics industry is organizing the first important postwar exhibition to be held in Dusseldorf, October 11-19, 1952. A plastics convention is to take place in connection with the exhibition, October 13-16, also in Dusseldorf, when well-known experts will discuss newest German developments and their possibilities.

Advance notices sent out by Nordwestdeutsche Ausstellungsgesellschaft, Dusseldorf, which is arranging the exhibition, mention some of the applications that will be demonstrated—plastic floors, the first silicones developed in Germany, the new isocyanate plastics, especially the Vulkollans; the new plastics produced by "Reppe Chemistry," electrical insulations of expanded plastics, the new ethoxylene resins for firm and lasting joints between metal parts, edible artificial sausage skins, new expanded materials for upholstery, etc.

[1] Apr., 1952.

The Vulkollans

Among the many papers read at the convention of the German Rubber Society, October 11, 1951, was "New Elastic Materials,"[1] by E. Weinbrenner, of the Farbenfabriken Bayer, Leverkusen, which referred to the diisocyanate-polyaddition process for the synthesis of plastics developed in Germany by O. Bayer and collaborators in the laboratories of the Bayer concern and specifically to the special case of the Vulkollans.

In this connection it is pointed out that during the war, work along similar lines had also been carried out by du Pont and I.C.I., leading to the production of Vulcaprene. Bell Telephone's Paracron, it is added, is a similar development.

Dr. Weinbrenner describes the main steps of the general method: formation of the polyester from glycol and adipic acid; reaction of the polyester with diisocyanate (in the case of the Vulkollans, with 1,5-naphthylene diisocyanate); cross-linkage through water.

Under the proper conditions of reaction of polyester with diisocyanate in the presence of water, the fluid state slides smoothly into the plastic state and finally to an elastic solid material insoluble in the usual solvents. If the reaction is stopped at the right time during the plastic, deformable state, there is a definite period (6-12 hours) during which the material can be milled, sheeted, and calendered; and if the interruption takes place at a very early stage of plastic deformability, the material can be extruded. The reaction can later be completed by reheating at 130-150° C., a process that may be likened to vulcanization. Fillers can be incorporated in the melted polyester, but only to a very limited extent by comparison with rubbers or other plastics.

The products obtained in this way are highly elastic, have unusually high tensile strength, excellent abrasion resistance, good aging qualities, and very good structural strength (tear resistance), it is further claimed. Because of the absence of oxidizable double-bonds, the products are completely resistant to ozone. In addition they resist oils, benzine, and to some extent also benzol. But they are affected by concentrated acids, alkalies, the prolonged action of steam and hot water; they are unsatisfactory under temperature conditions below 20 or above 130° C. With regard to processing, the materials have the disadvantages of being workable during only a limited period, and of lacking the property of adhesion.

It was found, however, that if, instead of water, dihydric alcohols were used as cross-linking agents, castable products were obtained which could undergo subsequent cross-linkage. Chemically the difference was that while the action of water led to the formation of urea bridges with separation of carbonic acid, reaction with dihydric alcohols resulted in formation of urethane without separation of carbonic acid. This permitted a method by which a semi-finished product, that could be stored, was obtained by casting, and finished later on by heating in molds. This material has excellent adhesion to fabrics, so that fabric inserts can be used to achieve bonding of Vulkollans to rubber or other plastics, to which Vulkollan itself will not adhere.

Practical experience is said to have shown that at the present stage of its development Vulkollan is well suited to the manufacture of heels (tests showed a life of 3,000-4,000 kilometers against 400-500 kilometers for heels of natural rubber); insoles, solid tires, cycle tires, cable covers. Cellular products, the so-called Moltoprenes, are produced by utilizing the carbon dioxide that splits off during the bridging reaction that takes place in the presence of water. These cellular materials are available as rigid, semi-rigid, and highly elastic products having specific gravities ranging from 0.02 to 0.5. Elastic Moltoprene can be foamed cold in blocks, plaques, or any form and can be rendered flame-resistant by the addition of substances like trichloroethylphosphate.

It is stressed that the elastic products are best prepared by a continuous process, for so far it has not been possible to develop a satisfactory method of intermediate stabilization of the different stages in the addition reaction of polyester and isocyanate which, seemingly, once started, must proceed to the end.

[1] *Kautschuk u. Gummi*, 5, 4, 49 (1952).

Adhesion Testing Apparatus

Chemische Werke, Huls, has developed a device which permits the measurement of blocking in plastic sheets and gives the value in grams per square centimeter. The device is an adhesion-testing apparatus which acts on the principle of a torsion balance and consists of two parts—the torsion balance itself and a separate hexagon-shaped frame for mounting six test pieces at a time. The force needed to separate two sheets

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laid one on top of the other is generated by a spiral spring arranged behind the dial face of the gage and is connected at one end with an indicator that acts as force-transmitter to a sample. The spring is tensioned by a control knob to which is connected a pointer which indicates on the gage dial the force required to separate the sheets.

The procedure follows. Elongated samples tapering to a point at one end are stamped from a piece of the sheet material to be tested (the tensile strength of the material must be greater than its adhesive strength) and are folded over and mounted, six at a time, in such a way that the pointed ends are free and protrude from the frame. A weight on a block is then placed on each sample, and the whole is allowed to stand at any desired temperature for any length of time. Then the weights are carefully removed; the frame is transferred to the torsion balance; the free end of the sample is engaged by a hook connected with the balance, and the latter is raised by a screw so that the free sample end is held upright. Next the control knob is turned until the free end begins to separate from the overlying fold at the frame edge. The position of the pointer connected with the control knob measures the adhesive strength of the samples.

For a set of six samples of the same material the greatest deviation from the average value was found to be 4% held quite satisfactory as an indication of adhesive strength.

To insure the widest measuring range, interchangeable spiral springs are available which, it is said, are easily fitted into the apparatus.

While the upper limit for thickness of samples at present is 0.4-millimeter, a new design of the apparatus is being developed with which it will be possible to measure thicker sheets and artificial leather.

NORWAY

During 1951, Norway is estimated to have used 4,960 long tons of rubber and 207 tons of synthetic rubber; she produced about 500 tons of reclaimed rubber.

Official statistics show the country produced 2,826,027 pairs of rubber footwear, 2,252,022 pairs of heels, 1,220,690 pairs of soles, and 43,651 square meters of soling material. Output of belting, hose, and packing came to 1,451 tons; of rubber-insulated cables, to 6,809 tons; and of other rubber goods (excluding tires), 3,857 tons.

Norway has only one tire factory, and trade sources put production in 1951 at 35,000 passenger-car tires, 30,000 truck and bus tires, and 12,000 motorcycle tires.

During 1950 and the early part of 1951, the country had imported too many tires, with the result that the end of 1951 found dealers with stocks on their hands representing about seven month's supply. Imports of tires in 1951 accordingly show a relatively sharp drop, from 2,078 tons in 1950 to 1,581 tons in 1951; imports of inner tubes in the same years were 149 and 119 tons, respectively.

FAR EAST

MALAYA

Report on Bugbee's Visit

A report on the impressions carried away from Malaya, after a six-week visit, by H. C. Bugbee, associate director of the Natural Rubber Bureau, Washington, D. C., U.S.A., is published in the August issue of *Natural Rubber News*. Practically all the points he treats have at different times been discussed in these columns, but a review of the report is useful not only because it presents various facts at one time, but also because these facts are important enough to bear repetition.

What most impressed Mr. Bugbee was the "new morale" and confidence of the entire population in its ability to destroy the Communist guerrilla menace, which attitude is largely inspired by Sir Gerald Templer's handling of the situation. There was also a genuine effort on the part of all communities—Malay, Chinese, and European—to build by democratic processes a strong government dedicated to improving standards of living, education, and social welfare, and, furthermore, a sincere desire to work closely with the other free nations and particularly with the United States and the United Kingdom.

Finally he brought out the concern felt in Malaya that the United States might not put in its proper international perspective the direct effect on the economics of Southeast Asia countries of a low synthetic rubber selling price based on government pricing policies rather than on orthodox private industry pricing practices.

Turning to a consideration of the smallholder, Mr. Bugbee showed how little room there was for further reduction in the average income of this group. At the rates and prices prevailing during his visit, the average smallholding (about four acres) yielded Str. $1,040, or U.S. $347, per annum. The smallholder's cost of living had quadrupled from 1940 to 1947 and had undergone an additional rise of almost 50% since.

Next Bugbee discussed the many emergency problems and expenses estates must face; they must pay and maintain, on 24-hour schedule, non-productive special constables. One estate of 12,000 acres, he said, had a security force of 85 men.

Security reasons necessitated relocation of laborers' housing, involving new construction including sanitary facilities, latex depots, schools, etc., in addition to provision of bus service to transport labor to and from their work areas which were now far removed from their dwellings.

The custom of early morning tapping (one hour before sunrise), when the air is cool and latex flow is greatest, has also had to be abandoned in the emergency.

There is in addition the loss, estimated to have represented as much as $3,000,000 in November, 1951, due to bandits forcing tappers to give up part of their daily collections of latex and tree scrap.

Despite all difficulties, Mr. Bugbee states, replanting continues on many estates although at a slower rate, and though they face the constant danger of ambush and sabotage, planters' morale is excellent.

Delegates at London Discussions

The delegates sent by the Malayan Government to represent the Malayan rubber producers at the meeting of the Rubber Study Group working party which began in London on July 30, included: Dato Onn bin Ja'afar, Member for Home Affairs; Oscar Spencer, Member for Economic Affairs; and Khoo Teik Ee, chairman of the Rubber Producers' Council. The Federation delegates would oppose the move by Indonesia for the introduction of restriction of rubber production, but they would support any reasonable long-term scheme for a stable rubber price. Dato Onn was expected to convince the Indonesians of the danger of unemployment and further deterioration of the situation in Malaya, where Communists are already active, that would follow the introduction of restriction at present.

The British and Americans were stated to be opposed to the Indonesian move because in their opinion fair and efficient administration of a restriction was almost impossible under the conditions prevailing in Indonesia.

For the first time the Malayan representatives will participate in the meetings as delegates and not as advisers and observers, as heretofore. This change resulted from the strong representa-

tions made by the Malayan contingent to the Secretary of State for Colonies, Oliver Lyttelton, over the way in which Malaya's case had been presented at the Ottawa Conference.

New Wage Scale Adopted

An agreement on wage rates for rubber estate workers was finally arrived at on July 7, thanks to the mediation of the Commissioner of Labor J. P. Biddulph. Negotiations between the Pan Malayan Rubber Workers' Union and the Malayan Planting Industries Employers' Association (M.P.I.E.A.) to fix new wage rates for the third quarter started in June, necessitated by the fact that the existing agreement which regulates wages on a sliding scale in accordance with quarterly average prices for rubber had made no provision for rates when the average price fell below $1.00 (Straits) a pound. Various proposals and counter-proposals were made, but negotiations collapsed July 1. It was then that the government stepped in, and after more bargaining the compromise suggested by the Labor Commissioner was accepted by both sides.

The new rates will be $3.40 a day for contract tappers, $2.90 for checkroll tappers, and $2.20 for field workers, as compared with $3.80, $3.00 and $2.30, respectively, when the price was between $1.00 and $1.50 a pound. The agreement gives workers of all grades 10 cents a pound more than the rates imposed by the M.P.I.E.A. on July 1, giving a total of $10,000,000 (Straits) for the 327,000 rubber estate workers.

Since the new rates apply only when the quarterly average price is under $1.00 and up to 90 cents (Straits) a pound, further negotiations were scheduled for the first week in August to fix wage rates when the price of rubber is between 50 and 90 cents a pound.

It was also agreed at the July 26 meeting that the cost of living allowances are to be calculated on a sliding scale based on the official retail price indices for Indian and Chinese workers and are to be assessed quarterly.

INDONESIA

On April 29 the new rubber testing station of the A.V.R.O.S., at Kampong Baru, Medan, North Sumatra, claimed to be the most modern of its kind in the Far East, was opened by A.V.R.O.S. President R. Nolen. In his inaugural address Mr. Nolen stressed the need of rubber producers to find ways to prevent the consumer from losing his preference for natural rubber and changing to synthetic. It was necessary to offer a product that not only conformed to RMA standards, but also satisfied requirements as to physical properties. The task of the new testing station would be to help make available such rubber for export—it would be technically classified. Mr. Nolen added that it would take years of cooperation with institutions in other lands before the technique of rubber classification entered its final perfected stage.

Referring more specifically to the General Experiment Station of the A.V.R.O.S., the speaker stated that this institute, of worldwide repute before the war, had had to curtail its activities to a considerable extent since the end of the war; the many postwar difficulties slow down efforts to make of it the scientific institution that North Sumatra needs. However the right path had been taken, he said, and producers were showing their confidence in the future by tackling rubber classification; and he personally felt sure that the Indonesian Government would not withhold its support where it was needed.

JAPAN

According to the Rubber Importers' Association, 4,641 long tons of rubber went to Japan in June, against 3,330 tons in May. Crude rubber imports for the first half of 1952 totaled 22,273 long tons, value $19,617,790, of which Malaya supplied 18,144 tons, value $16,007,012, and Indonesia, 4,129 tons, value $3,610,-778. Latex arrivals for the first half of 1952 amounted to 511.5 tons, of which Malaya supplied 336.5 Indonesia, 170 tons, and Ceylon five tons.

At the same time 1,407 tons of synthetic rubber were imported of which 1,380 tons came from the United States and the rest from Canada. Of the entire total, 1,150 tons were bought by the Japanese Government on the Emergency Purchase Account.

Editor's Book Table

BOOK REVIEWS

"Industrial Process Control by Statistical Methods." John D. Heide. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 306 pages. Illustrated. Price $6.00.

The material in this book is confined to that phase of industrial statistics pertaining to the direct control of industrial processes and reflects nearly 10 years' experience of the author in a broad field of applying statistical methods to industrial problems in the plants of United States Rubber Co.

The book is designed for the man in the factory who wants to use statistics in the control of his processes, but who does not have available the services of either an academic statistician or an experienced industrial statistician. The statistical concepts and methods necessary for successful application are introduced, and their use is explained.

The practical aspects of the book should enhance its value for college use by students planning to enter industry. An attempt has been made to combine a development of the essential statistical techniques with a discussion of the practical problems which will confront the new engineer or chemist in industry. Exercises are found at the end of each of the 14 chapters so that the reader may test his knowledge of what he has learned.

Early chapters cover presentation of data, process frequency distribution, control charts and limit lines. Later chapters on factory installation, practical program aids, factory interpretation of charts, and organization and administration discuss many of the technical as well as practical problems of the use of industrial statistical methods in the plant. The book is concluded and quite properly with a chapter, "Evaluation of Test Procedures and Test Results."

Appendices includes a glossary of symbols and a glossary of terms as well as such things as tables relating to normal frequency distribution, an explanation of how to construct a normal curve from factory data, and a section on standard operating procedure manual on procedure for establishing and maintaining measurement of control.

"The Physical Chemistry of Surface Films." W. D. Harkins. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 428 pages. Price, $10.

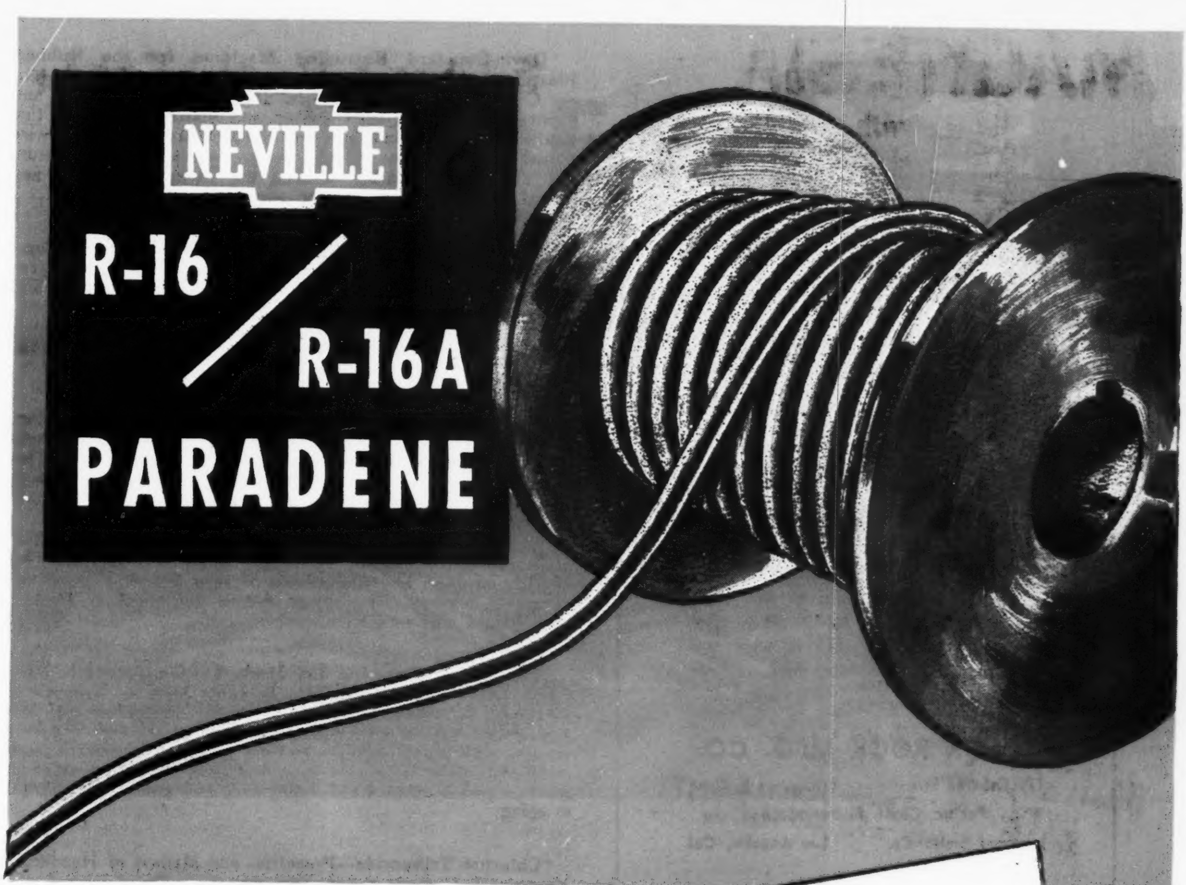
This volume covers all of the fundamental pioneer work of the late W. D. Harkins on the mechanism of liquid-to-liquid films and interfaces, surface tension, emulsification, energetics of surfaces, the nature of films on liquid and solid sub-phases, and the properties of solutions of long-chain electrolytes. Included also is an introductory study of the electric layer written by E. J. W. Verwey. Though some of the material appeared in earlier publications, this book provides a valuable guide to the many advances in emulsion technology, including emulsion polymerization, upon which the author was working at the time of his death, and includes much data previously unpublished. As a treatise on basic principles, this volume will be of great value to all chemists and physicists whose work involves an understanding of detergency, films, foams, or any type of heterogeneous system.

Of special interests to workers in the rubber and plastics industries is the chapter on "Mechanism of Emulsion Polymerization," in which the basic theory of Harkins is outlined and explained.

NEW PUBLICATIONS

Publications of Dow Corning Corp., Midland, Mich. **"Silastic Facts."** No. 10a, May, 1952. 16 pages. This revised bulletin provides up-to-date information on Silastic and its properties, with special emphasis on electrical properties and resistance to temperature, weathering, chemicals, compression set, and thermal aging.

"Dow Corning Silastic R Tape." Data Sheet G-25. 4 pages. Complete data are given on the properties and applications of Silastic R Tape, a Class H insulation for wrapping coils and other electrical equipment.



FOR WIRE INSULATION

These coumarone resins are excellent, economical softeners, pigment-dispersing aids, and extenders in both natural and synthetic rubber wire insulation compounds. In themselves they have excellent electrical properties, impart high tensile with good elongation, good tear resistance, and produce a more uniform compound with a minimum of mixing.

They have been proven the optimum softeners and pigment-dispersing agents, particularly with the more difficult non-carbon black reinforcing fillers.

THE NEVILLE COMPANY
PITTSBURGH 25, PA.
Plants at Neville Island, Pa., and Anaheim, Cal.

R-48

Chemicals for the Rubber Industry

"Davis-Standard Extruding Machines for the Rubber, Plastics, and Electrical Wire Industries." Standard Machinery Co., Mystic, Conn. 12 pages. In addition to describing and illustrating the company's rubber and plastics extruders, this catalog presents information on complete assemblies for wire insulating and continuous vulcanizing. Separate sections discuss the Therma-Fin heating jackets, the Stream-Flo head, and special auxiliary equipment for wire insulating.

"Products of Latex and Chemical Division." Rubber Corp. of America, Brooklyn 6, N. Y. 23 pages. This bulletin gives the properties and applications of the company's latex and chemical division products, including natural and GR-S latices, special-purpose natural and synthetic latex compounds, special-purpose vinyl plastisols, and four ester-type plasticizers for rubbers and plastics.

Publications of The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y. **"Correct Tire Pressures for 1949, 1950, 1951, and 1952 Passenger Cars."** This 17- by 22-inch display chart lists the different automobile makes and models and gives the tire size, number of tire plies, and correct tire inflation for each car.

"Recommended Farm Tire Inflation." This combination letter and display poster, which lists the correct pressures for all sizes of front and rear wheels of farm tractor tires, is designed to prevent tire damage during unloading of tractors from freight cars or trucks.

"Thiuram M-Tepidone for High Tensile Strength Neoprene Latex Films." BL-246. E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. 8 pages. Information and test data reveal that a combination of Thiuram M and Tepidone imparts high tensile strength to films made from neoprene latex compounds. The films also show low modulus, high elongation, good properties after water immersion, and excellent resistance to aging.

"Chlorine Trifluoride—Properties and Method of Handling." Manual CT-1. Pennsylvania Salt Mfg. Co., Philadelphia 7, Pa. 14 pages. The first part of this manual offers complete information on the storage and handling of chlorine trifluoride cylinders, including toxicology and first-aid treatments; while the second part gives the properties of the material.

"Calco Rubber Chemicals." Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. Contained in a loose-leaf binder, this catalog gives latest information on the properties, compounding, and specifications of the various Calco accelerators, antioxidants, peptizers, retarders, and stiffening agents. A review of progress in rubber compounding, discussions of analytical methods used in testing, and reference data appear in separate sections.

"Taylor-Stiles Cutters for the Rubber Industry." Taylor, Stiles & Co., Riegelsville, N. J. 4 pages. Specifications and descriptions of the firm's rubber cutting machines are given in this illustrated folder, together with discussions of design features and machine applications.

"Imagineering with G-E Silicone Rubber." Bulletin CDS-3. General Electric Co., Pittsfield, Mass. 24 pages. Comprehensive information on the properties, applications, classes, and design specifications of the G-E silicone rubbers appears in this illustrated booklet, intended for designers, purchasing agents, and engineers.

"Styrene Monomer." Monsanto Chemical Co., Texas Division, Texas City, Tex. 40 pages. This illustrated booklet briefly describes styrene monomer and its derivatives, including styrene based dispersions, polyester resins, elastomers, styrene modified alkyd-type resins, styrenated oils, and others. In addition to characteristics and uses of the various derivatives, there is a list of patent and literature references to styrene copolymers and reaction products.

"Distec Fatty Acids." Hess Products, Ltd., 4 Albion St., Leeds 1, England. 23 pages. This catalog covers the properties, composition, uses, and shipping of each of the firm's 17 fatty acids for use in rubber and other chemical products.

"Struthers Wells Processing Vessels." Struthers Wells Corp., Warren, Pa. 16 pages. Design data, dimensional drawings, and specifications are given for the firm's liquid agitators. Data on mixing equipment for solids and pastes are also included in the brochure, together with a section on custom-made pressure vessels.

"Paracril Nitrile Rubbers—Resistance to Solvents, Fuels, Oils, and Chemicals." Technical Bulletin No. 2. United States Rubber Co., Naugatuck, Conn. 20 pages. Extensive data are given by means of tables and graphs on the resistance of the different Paracril rubbers to various types of solvents, fuels, oils, and chemicals.

"Stauffer Chemicals for Industry and Agriculture." Stauffer Chemical Co., 420 Lexington Ave., New York 17, N. Y. 109 pages. This revised edition of the firm's general catalog offers full information on the composition, properties, applications, packing, shipping, and stocks of basic chemicals for industry and agriculture. The inclusion of numerous data tables provides assistance to the user of these chemicals.

"The R.C. 65 Twin-Screw Extruder with Variable Speed Drive." R. H. Windsor, Ltd., 16 Finsbury Sq., London E.C.2, England. 4 pages. This bulletin presents a description and specifications for the new R.C. 65 extruder, a versatile twin-screw unit suitable for compounding, extruding, coloring, and scrap reclaiming of plastics.

"Witco Dibutyl Phthalate." Technical Service Report E-4. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y. 1 page. The properties and applications of the company's brand of dibutyl phthalate are given in this report.

"Annual Report on the Progress of Rubber Technology. Vol. XV, 1951." Edited by T. J. Drakeley. Published by W. Heffer & Sons, Ltd., Cambridge, England, for the Institution of the Rubber Industry, 12 Whitehall, London S.W.1, England. Cloth, 7½ by 9¾ inches, 142 pages. Price, 1/1/0. This latest book in the series consists of 22 articles on developments during 1951 in the following fields: planting and production of rubber and latex; latex properties and applications; rubber physics and chemistry; synthetic rubber; testing equipment; compounding ingredients; fibers and fabrics; properties of vulcanized rubber; tires; belting; hose and tubing; cable and insulation; footwear; mechanical goods; games, sports accessories, and toys; surgical goods; textile-rubber composites, solvents, and cements; cellular rubber; hard rubber; flooring; and machinery and appliances. A historical and statistical review article is also included, and there are name and subject indices.

"Cyanamid Metallic Stearates." American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 8 pages. Revised specifications, together with brief descriptions of applications, for Cyanamid's metallic stearates appear in this booklet. The revisions include controls on the purity and uniformity of the component fatty acids, based on recent research in the stearate field.

"Lustrex LH, An Improved Impact Styrene Molding Powder." Production Information Bulletin No. 76. Monsanto Chemical Co., Springfield 2, Mass. 12 pages. This bulletin offers information on the available form and colors, properties, molding and extrusion techniques, and finishing of the company's improved impact styrene molding material.

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BRAZIL

It is learned that, following a recent decree of the Brazilian Government, Firestone, Goodyear, and Pirelli, the most important rubber goods manufacturers in Brazil, have sent experts to the Guapare and Acre Territories to find the most suitable districts for rubber plantations.

A news note states that Brazil is now producing enough polystyrene to meet domestic needs and that one company is to begin exporting on a small scale.

MARKET REVIEWS

RUBBER

New York Spot Market
Week-End Closing Prices

	July 19	July 26	Aug. 2	Aug. 9	Aug. 16
R.S.S.: #1	30.25	30.75	30.75	31.00	31.00
#2	29.50	30.25	30.25	30.50	30.50
#3	28.50	29.25	29.50	29.75	29.50
Latex Crepe:					
#1 Thick	40.25	39.25	40.00	40.00	39.50
Thin	39.00	39.25	39.25	39.25	39.50
#3 Amber Blankets	24.25	24.75	25.25	25.25	25.25
Thin Brown Crepe	21.75	21.75	21.75	21.75	23.25
Flat Bark	18.25	18.25	18.50	18.50	19.00

LIMITED activity marked the spot rubber market during most of the period from July 16 to August 15 in view of high priced offerings from the Far East and a general lull in manufacturing operations. An improvement in market interest was noted during the second week in August, especially for October deliveries, as steel industry operations began to pick up after the late strike. As shown in the table of week-end closing prices, spot rubber prices showed little change throughout the period.

Commodity Exchange
Week-End Closing Prices

Futures	June 28	July 19	July 26	Aug. 2	Aug. 9	Aug. 16
Dec.	29.85	28.30	28.20	28.15	28.75	28.50
Mar.	28.35	27.35	27.30	27.15	28.00	27.60
May	27.75	26.75	26.75	26.70	27.80	27.40
July	27.15	26.40	26.35	26.55	27.60	27.00
Total weekly sales, tons	4,630	2,550	2,080	1,010	1,970	2,570

Little trading in rubber futures was noted on the New York Commodity Exchange, reflecting the dullness of the spot market. Nearby months showed the most strength, but actual price movements were narrow and of little significance. December futures fluctuated between 28.10-28.95¢ throughout the period and closed at 28.50¢ on August 15. The quietness of the market was shown by the 4,590 tons traded during the second half of July, making the monthly total only 10,360 tons, as compared with 20,710 tons in June. Only 4,750 tons were sold on the Exchange during the first half of August.

Latex

ONLY moderate activity was reported in the latex market during the period from July 16 to August 15. The industrial dislocations caused by the steel strike contributed to the hesitancy of latex consumers to purchase in excess of minimum working levels. This reluctance to buy other than the nearby positions has caused producers and importers to assume burdensomely long positions themselves, with the result that working inventories have not been accumulated either here or in the producing areas. In view of the unpredictable latex market and their inability to obtain sustained long-term commitments, many latex producers are operating below capacity, and any sudden upswing in demand would result in a latex shortage. It now appears that a tight supply position will develop during the last quarter of this year, according to Arthur Nolan, Latex & Rubber, Inc., writing in the August issue of *Natural Rubber News*. On the other hand, the competitive effect of synthetic latex in reducing demand for natural latex at current prices has still to be determined.

Hevea latex prices were in the range of 38-44¢ a pound dry solids throughout the period, although one or two new firms in the field were reported to be promoting their product by selling at discount prices. Latex prices were unchanged from the preceding month despite a softening of dry rubber prices and indicate that even further increases in the latex price differential over dry rubber may occur in the next few months in order to obtain adequate supplies. Preliminary estimates for *Hevea* latex in June follow: imports, 4,425 long tons, dry weight; consumption, 3,901 long tons; and month-end stocks, 9,193 long tons.

GR-S latex prices continued unchanged and range from 21.5-26.0¢ a pound, dry weight. May production of GR-S latex totaled 3,619 long tons, dry weight; imports, 227 long tons; consumption, 3,271 long tons; and month-end stocks, 3,740 long tons. Estimates for June are: production, 3,527 long tons, dry weight; imports, 258 long tons; consumption, 3,388 long tons; and month-end stocks, 4,019 long tons.

Neoprene latex figures for May are: production, 550 long tons, dry weight; consumption, 598 long tons; and month-end stocks, 1,112 long tons. Preliminary June figures show a production of 544 long tons, dry weight; consumption, 539 long tons; and month-end stocks, 946 long tons.

Statistics on nitrile rubber latex for May follow: production, 386 long tons, dry weight; consumption, 251 long tons; and month-end stocks, 507 long tons. June estimates are for a production of 336 long tons, dry weight; consumption 232 long tons; and month-end stocks, 559 long tons.

SCRAP RUBBER

TRADING in scrap rubber continued to be very limited during the period from July 16 to August 15. Reclaiming mills reopening after their vacation shutdowns were confining themselves to small and scattered purchases of scrap. At the beginning of August there was a slight reawakening of interest in tubes, particularly red tubes, and there were some reports of a withholding movement in tubes for speculative purposes.

The immediate outlook for scrap rubber is considered far from bright in trade circles in view of the strong competition being offered to reclaim by synthetic rubber. Export business has also dropped off because of a dollar shortage abroad. Owing to the lack of business, scrap dealers continued to regard current prices as strictly nominal and not to be considered the basis for any actual trading.

Following are dealers' selling prices for scrap rubber in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$9.00	$12.00
S. A. G. auto tires	Nom	Nom.
Truck tires	Nom.	12.00/ 13.00
Peelings, No. 1	Nom.	42.50/ 45.50
2	Nom.	23.00
3	Nom.	20.00
	(¢ per Lb.)	
Auto tubes, mixed	2.75/ 3.00	2.75/ 3.00
Black	3.00	3.75
Red	7.25/ 7.75	7.25/ 7.75
Butyl	1.75/ 2.00	1.75/ 2.00

RECLAIMED RUBBER

DESPITE the reopening of reclaiming mills after vacation shutdowns, the reclaimed rubber market continued dull during the period from July 16 to August 15. The immediate outlook for reclaim is pessimistic in view of the continued refusal of rubber goods manufacturers to make any long-term commitments for reclaim. Expectations of declining natural rubber prices, particularly the off-grades which furnish competition to reclaim, are contributing to the general cautious attitude of the market. The low level of business led to some price reductions for reclaims early in August. Tube reclaims, both natural rubber and butyl, and some types of colored specialty reclaims were cut by most mills by approximately 1¢ a pound. Black natural rubber tube reclaims are now selling at about 15-16¢ a pound; while butyl tube reclaims are now priced at 12½¢ a pound.

Final May and preliminary June statistics on the domestic reclaimed rubber industry are now available. Final May figures follow: production, 23,142 long tons; imports, 125 long tons; consumption, 22,314 long tons; exports, 1,078 long tons; and month-end stocks, 40,169 long tons. Preliminary figures for June show a production of 21,045 long tons; imports, 100 long tons; consumption, 21,795 long tons; exports, 1,074 long tons; and month-end stocks, 40,083 long tons.

COTTON AND FABRICS

New York Cotton Exchange
Week-End Closing Prices

Futures	June 28	July 19	July 26	Aug. 2	Aug. 9	Aug. 16
Oct.	36.96	36.63	36.90	38.29	38.70	38.89
Dec.	36.76	36.40	36.70	38.06	38.50	33.85
Mar.	36.62	36.30	36.62	37.88	38.35	38.80
May	36.43	36.14	36.45	37.70	38.18	38.65
July	36.08	35.70	36.04	37.04	37.45	38.10
Oct.	34.56	34.24	34.59	35.25	35.75	[illegible]

FIRM prices and renewed activity featured the cotton market during the period from July 16 to August 15. Futures prices advanced steadily, reflecting the upswing in the fabric market. Spot prices showed little overall change for the period; an advance during the first three weeks was balanced by the decline during the last week of the period. The spot price advance was halted by the United States

Department of Agriculture's August 8 estimate of the current cotton crop. This estimate of a 14,735,000-bale crop was large enough to meet predicted needs and provide for some reserve stocks and counteracted the bullish market movement that was based on expectations of a tight spot supply.

The spot price for 15/16-inch middling cotton started the period at 39.95¢, rose steadily to a high of 41.65¢ on August 7, and then fell off to close at 40.50¢ on August 15. The rising futures prices were exemplified by October futures, which began the period at 36.60¢, rose to a high of 39.30¢ on August 4, and ended the period at 38.89¢.

Fabrics

The tempo of trading in wide industrial cotton fabrics picked up during the period from July 16 to August 15. The greatest improvement in demand was for wide drills and sheetings, which showed a strong price tone. Wide sateens, broken twills, and ducks also were active, especially for delivery in October. Sales in osnaburgs, hose and belting ducks, and chafer fabrics continued slow during the period, but are expected to improve as the general fabric market revival gets under way.

Cotton Fabrics

Drills			
59-inch 1.85-yd ... *yd.*	$0.38	/	$0.385
2.25-yd	.33	/	.335
Ducks			
38-inch 1.78-yd S. F. ... *yd.*	nom.		
2.00-yd D. F.	nom.		
51.5-inch, 1.35-yd, S. F.	nom.		
Hose and belting	.76		
Osnaburgs			
40-inch 2.11-yd. ... *yd.*	.245		
3.65-yd	.155		
Raincoat Fabrics			
Print cloth, 38½-inch, 64x60 ... *yd.*	.1575		
Sheeting, 48-inch, 4.17-yd	.22⅛		
52-inch 3.85-yd	.24⅛		
Chafer Fabrics			
14-oz. sq. yd. Pl. ... *lb.*	.79		
11.65-oz. sq. yd. S	.74		
10.80-oz. sq. yd. S.	.76	/	.78
8.9-oz. sq. yd. S.	.795		
Other Fabrics			
Headlining, 68-inch 1.35-yd., 2-ply ... *yd.*	nom.		
68-inch, 1.25-yd. 2-ply	.67		
Sateens, 53-inch 1.32-yd	.60	/	.61
58-inch 1.21-yd	.66		
Tire Cords			
K. P. std., 12-4-2 ... *lb.*	.85		

RAYON

THE upward trend in shipments of rayon which began in April continued during July, when 110,900,000 pounds were shipped. During that month, rayon production was 97,900,000 pounds, and month-end stocks declined to 81,000,000 pounds. July production of viscose high-tenacity yarn totaled 36,100,000 pounds, or 98% of capacity; shipments were 36,000,000 pounds; and month-end stocks, 4,200,000 pounds.

Total production of high-tenacity yarn during the second quarter of 1952 amounted to 105,100,000 pounds, an increase of 8,400,000 pounds over the first-quarter figure. The second quarter marked the first time that yarn shipments for tires and related uses passed the 100,000,000-pound mark; the actual figure was 102,500,000 pounds, or 51% of all yarn shipments. Tire yarn shipments during the second quarter increased by 8,100,000 pounds over those of the preceding quarter.

By an amendment to Order M-2, the NPA removed restrictions on the use of high-tenacity rayon for tire cord and other rubber products, effective July 22. On July 23 the NPA added high-tenacity rayon to the list of materials for which DO ratings may not be extended or offered to obtain delivery. Direct defense orders bearing A, B, C, or E ratings, as well as those carrying Z-1 or Z-2 identification symbols, are not affected.

Despite some increases in acetate and cupra yarn prices, no changes were made in viscose tire yarn and fabric prices during the period from July 16 to August 15, and current prices follow:

Rayon Prices

Tire Yarns			
1100/480			$0.63
1100/490			.62
1150/490			.62
1650/720			.62
1650/980			.61
1900/980			.61
2200/960			.61
2200/980			.60
4400/2934			.63
Tire Fabrics			
1100/490/2			.72
1650/980/2	$0.659	/	.73
2200/980/2			.685

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Belden Mfg. Co.	Com.	$0.40 q.	Sept. 1	Aug. 19
Borg-Warner Corp.	Com.	1.00 q.	Sept. 2	Aug. 13
Brown Rubber Co., In.	Com.	0.25	Sept. 1	Aug. 22
Brunswick-Balke-Collender Co.	Com.	0.25	Sept. 15	Sept. 2
	Pfd.	1.25 q.	Oct. 1	Sept. 19
Carborundum Co.	Com.	0.35	Sept. 10	Aug. 22
Endicott Johnson Corp.	Com.	0.40 q.	Oct. 1	Sept. 18
	4% Pfd.	1.00 q.	Oct. 1	Sept. 18
Faultless Rubber Co.	Com.	0.25	Oct. 1	Sept. 15
Firestone Tire & Rubber Co.	4½% Pfd.	1.12½ q.	Sept. 1	Aug. 15
Flintkote Co.	Com.	0.50 q.	Sept. 10	Aug. 27
	$4.00 Accum. Pfd.	1.00 q.	Sept. 15	Sept. 1
Garlock Packing Co.	Com.	0.25 q.	Sept. 30	Sept. 12
General Tire & Rubber Co.	Com.	0.50 q.	Aug. 29	Aug. 19
Goodall-Sanford, Inc.	Com.	0.37½	Sept. 1	Aug. 15
Johnson & Johnson Co.	Com.	0.25 q.	Sept. 11	Aug. 25
Minnesota Mining & Mfg. Co.	Com.	0.25	Sept. 12	Aug. 21
	$4.00 Pfd.	1.00 q.	Sept. 12	Aug. 21
Phelps Dodge Corp.	Com.	0.65	Sept. 10	Aug. 15
Thermoid Co.	Com.	0.20 q.	Sept. 30	Sept. 2
Timken Roller Bearing Co.	Com.	0.75	Sept. 10	Aug. 20
United Elastic Corp.	Com.	0.60	Sept. 10	Aug. 18
United States Rubber Co.	Com.	0.50	Sept. 10	Aug. 20
	Non. Cum. Pfd.	2.00 q.	Sept. 10	Aug. 20
Westinghouse Air Brake Co.	Com.	0.40 q.	Sept. 15	Aug. 15

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, June, May, 1952; June, 1951

	June, 1952	% of Change from Preceding Month	May, 1952	First Six Months, 1952	First Six Months, 1951
Passenger Casings					
Shipments					
Original equipment	2,190,544		2,223,976	12,186,750	14,828,063
Replacement	5,569,099		3,996,136	22,442,499	17,116,844
Export	74,652		32,366	310,493	323,341
TOTAL	7,834,295	+25.30	6,252,478	34,939,742	32,268,248
Production	6,067,076	− 0.04	6,069,190	36,563,102	31,742,147
Inventory end of month	8,649,809	−16.74	10,388,646	8,649,809	2,520,890
Truck and Bus Casings					
Shipments					
Original equipment	426,166		494,582	2,871,309	2,887,377
Replacement	687,215		627,752	3,962,595	4,890,327
Export	55,325		68,336	484,357	379,925
TOTAL	1,168,706	− 1.85	1,190,670	7,318,261	8,157,629
Production	1,299,916	− 4.72	1,364,239	8,547,500	8,410,923
Inventory end of month	3,018,414	+ 5.00	2,874,752	3,018,414	986,656
Total Automotive Casings					
Shipments					
Original equipment	2,616,710		2,718,558	15,058,059	17,715,440
Replacement	6,256,314		4,623,888	26,405,094	22,007,171
Export	129,977		100,702	794,850	703,266
TOTAL	9,003,001	+20.96	7,443,148	42,258,003	40,425,877
Production	7,366,992	− 0.89	7,433,429	45,110,602	40,153,070
Inventory end of month	11,668,223	−12.03	13,263,398	11,668,223	3,507,546
Passenger (Including Motorcycle and Truck and Bus Tubes					
Shipments					
Original equipment	2,609,527		2,718,339	15,052,867	17,721,189
Replacement	3,323,260		2,548,499	16,529,998	17,604,123
Export	107,449		63,469	568,066	406,746
TOTAL	6,040,236	+13.32	5,330,307	32,150,931	35,732,058
Production	5,535,555	− 4.08	5,770,673	33,004,631	33,321,172
Inventory end of month	10,973,997	− 4.51	11,492,670	10,973,997	5,306,976

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

COMPOUNDING INGREDIENTS*

Abrasives

Pumicestone, powdered	lb.	$0.025	$0.0425
Rottenstone, domestic	ton	40.00	48.00

Accelerators, Organic

A-10	lb.	.40	.47
A-19	lb.	.52	.58
A-32	lb.	.61	.68
A-77	lb.	.47	.60
A-100	lb.	.47	.60
Accelerator 8	lb.	.98	
49	lb.	.495	.505
552	lb.	2.00	
808	lb.	.59	.61
833	lb.	1.13	1.15
Altax	lb.	.435	.46
Arazate	lb.	2.235	
Beutene	lb.	.61	.66
Bismate	lb.	3.00	
B-J-F	lb.	.27	.32
Butasan	lb.	1.035	
Butazate	lb.	1.035	
Butyl Eight	lb.	1.10	1.35
Zimate	lb.	1.035	
Captax	lb.	.34	.36
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Cuprax	lb.	.60	.62
Diesterex N	lb.	.50	.57
DOTG (diorthotolyguanidine)	lb.	.52	.55
DPG (diphenylguanidine)	lb.	.43	.505
El-Sixty	lb.	.465	.535
Ethasan	lb.	1.035	
Ethazate	lb.	1.035	
Ethex	lb.	1.00	
Ethyl Thiurad	lb.	1.035	
Tuads	lb.	1.035	
Tuex	lb.	1.035	
Zimate	lb.	1.035	
Ethylac	lb.	.91	.93
Good-rite Erie	lb.	.35	.37
Hepteen	lb.	.435	.495
Base	lb.	1.80	1.90
Ledate	lb.	1.00	
M-B-T	lb.	.35	.40
-XXX	lb.	.455	.475
M-B-T-S	lb.	.42	.485
Merac	lb.	.75	1.03
Mertax	lb.	.455	.525
Methasan	lb.	1.035	
Methazate	lb.	1.035	
Methyl Tuads	lb.	1.135	
Zimate	lb.	1.035	
Monex	lb.	1.135	
Mono-Thiurad	lb.	1.135	
Morfex	lb.	.61	.66
NOBS No. 1	lb.	.68	.70
O-X-A-F	lb.	.445	.495
Pentex	lb.	1.035	
Flour	lb.	.20	
Phenex	lb.	.49	.54
Pip-Pip	lb.	2.07	
R-2 Crystals	lb.	2.20	
Rotax	lb.	.455	.475
S. A. 52	lb.	1.135	
57, 62, 67, 77	lb.	1.035	
66	lb.	1.50	
Santocure	lb.	.68	.75
Selenac	lb.	1.50	
Setsit No. 5	lb.	.75	1.05
SPDX-GH	lb.	.64	.69
GL	lb.	.95	
Tellurac	lb.	1.45	
Tepidone	lb.	.55	
Tetrone A	lb.	1.85	
Thiocarbanilide (A-1)	lb.	.48	.55
Thiofide	lb.	.435	.505
S	lb.	.465	.535
Thionex	lb.	1.10	
Thiotax	lb.	.35	.42
Thiurad	lb.	1.135	
Thiuram E	lb.	1.00	
M	lb.	1.10	
Trimene	lb.	.56	.66
Base	lb.	1.03	1.18
Tuex	lb.	1.135	
2-MT	lb.	.75	
Ultex	lb.	1.00	1.10
Unads	lb.	1.135	
Ureka Base	lb.	.66	.73
Z-B-X	lb.	2.45	
Zenite	lb.	.42	.44
A	lb.	.50	.52
Special	lb.	.43	.45
Zetax	lb.	.445	.465

Accelerator-Activators, Inorganic

Lime, hydrated	ton	10.00	17.00
Litharge, comml.	lb.	.1775	.1885
Eagle, sublimed	lb.	.1875	.1885
National Lead	lb.	.1875	.1885
Red Lead, comml	lb.	.1875	.2025
Eagle	lb.	.1975	
National Lead	lb.	.1975	
White lead, basic	lb.	.177	.187
Eagle, National Lead	lb.	.177	.187
White lead, silicate	lb.	.158	.2125
Eagle	lb.	.195	.2125
National Lead	lb.	.158	.168
Zinc oxide, comml.†	lb.	.1475	.18

Accelerator-Activators, Organic

Aktone	lb.	$0.22	$0.23
Barak	lb.	.60	
Curade	lb.	.57	.59
D-B-A	lb.	1.95	
Delac P	lb.	.45	.52
Emersol 110	lb.	.115	.1275
120	lb.	.12	.1325
130	lb.	.1425	.155
210 Elaine	lb.	.1175	.1475
Emery 600	lb.	.095	.125
Guantal	lb.	.55	.62
Hyfac 430	lb.	.14	.1525
431	lb.	.16	.1725
Laurex	lb.	.26	.29
MODX-B	lb.	.295	.345
NA-22	lb.	1.50	
Palmalene	lb.	.35	
Plastone	lb.	.27	.30
Polyac	lb.	1.60	
Ridacto	lb.	.25	.26
Seedine	lb.	.1485	.1705
SOAC-KL	lb.	.065	.09
Stearex Beads	lb.	.14⅞	.15⅞
Stearic acid, single pressed	lb.	.115	.1275
Double pressed	lb.	.12	.1325
Triple pressed	lb.	.1425	.155
Stearite	lb.	.095	.10
Tonox	lb.	.515	.605
Zinc stearate	lb.	.37	.39

Alkalies

Caustic soda, flake	100 lbs.	3.75	6.77
Liquid, 50%	100 lbs.	2.55	2.75
Solid	100 lbs.	3.35	5.05

Antioxidants

AgeRite Alba	lb.	2.275	2.375
Gel	lb.	.62	.64
H.P.	lb.	.695	.715
Hipar	lb.	.94	.96
Powder	lb.	.505	.525
Resin	lb.	.67	.69
D	lb.	.505	.525
Stalite	lb.	.505	.525
White	lb.	1.45	1.55
Akroflex C, F	lb.	.67	.69
Albasan	lb.	.69	.73
Aminox	lb.	.505	.595
Antioxidant 2246	lb.	1.65	1.68
Antisol	lb.	.23	.24
Antox	lb.	.49	.51
Aranox	lb.	3.25	
Betanox Special	lb.	.725	.815
B-L-E, -25	lb.	.505	.595
Burgess Antisun Wax	lb.	.21	
B-X-A	lb.	.505	.595
Copper Inhibiter X-872-L	lb.	1.95	
Flectol H	lb.	.505	.575
Flexamine	lb.	.695	.785
Heliozone	lb.	.25	.26
Ionol	lb.	.91	1.40
NBC	lb.	1.50	
Neozone A	lb.	.51	.53
C	lb.	.67	
D	lb.	.45	.51
Perflectol	lb.	.61	.68
Permalux	lb.	1.85	
Rio Resin	lb.	.54	.56
Santoflex 35	lb.	.695	.765
AW	lb.	.75	.82
B	lb.	.505	.575
BX	lb.	.62	.69
Santovar A	lb.	1.50	1.57
O	lb.	1.30	1.37
Santowhite Crystals	lb.	1.60	1.67
L	lb.	.505	.575
MK	lb.	1.29	1.36
S.C.R.	lb.	.32	.34
Sharples Wax	lb.	.23	.28
Stabilite	lb.	.53	.57
Alba	lb.	.72	.79
L	lb.	.60	.64
White	lb.	.53	.62
Powder	lb.	.41	.47
Sunolite	lb.	.20	
Sunproof	lb.	.25	.30
Improved	lb.	.23	.28
Jr	lb.	.18	.23
Thermoflex A	lb.	.98	1.00
Tonox	lb.	.50	.5975
Tysonite	lb.	.24	.24
V-G-B	lb.	.67	.76
Wing-Stay S	lb.	.495	.505
Zenite	lb.	.33	.35

Antiseptics

Copper naphthenate, 6-8%	lb.	.2275	
Pentachlorophenol	lb.	.21	.29
Resorcinol, technical	lb.	.825	.835
Zinc naphthenate, 8-10%	lb.	.235	.285

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxide.

‡At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

Blowing Agents

Ammonium, bicarbonate	lb.	$0.06	$0.07
Carbonate	lb.	.23	.24
Celogen	lb.	1.95	
50-C	lb.	1.01	
Sodium bicarbonate	100 lbs.	2.10	3.15
Carbonate, tech	100 lbs.	1.20	5.02
Unicel	lb.	.82	
ND	lb.	1.40	
S	lb.	.20	

Bonding Agents

BAC Latex	lb.	.75	.80
G-E Silicone Paste SS-15	lb.	4.52	5.10
SS-64	lb.	3.65	6.75
-67 Primer	lb.	7.50	12.50
Gen-Tac Latex	lb.	.75	.855
MDI-50	lb.	2.75	3.25
Thixons	gal.	1.48	12.00
Ty-Ply BN, Q, S, 3640	gal.	6.75	8.00

Brake Lining Saturants

B.R.T. No. 3	lb.	.024	.025
Resinex L-S	lb.	.0225	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-20	lb.	.15	.22
R-40	lb.	.18	.24
Kosmos/Dixie BB	lb.	.195	.25
Spheron C	lb.	.14	.185
N	lb.	.25	.30
Voltex	lb.	.18	.315

Easy Processing Channel—EPC

Continental AA	lb.	.074	.1225
Kosmobile 77/Dixiedensed 77	lb.	.074	.1225
Micronex W-6	lb.	.074	.1225
Spheron #9	lb.	.074	.1225
Texas E	lb.	.074	.1175
Witco #12	lb.	.074	.1225
Wyex	lb.	.074	.12

Hard Processing Channel—HPC

Continental F	lb.	.074	.1225
HX	lb.	.074	.12
Kosmobile S/Dixiedensed S	lb.	.074	.1225
Micronex Mk. II	lb.	.074	.1225
Spheron #4	lb.	.074	.1225
Witco #6	lb.	.074	.1225

Medium Processing Channel—MPC

Arrow TX	lb.	.074	.12
Continental A	lb.	.074	.1225
Kosmobile S-66/Dixiedensed S-66	lb.	.074	.1225
Micronex Standard	lb.	.074	.1225
Spheron #6	lb.	.074	.1225
Texas M	lb.	.074	.1175
Witco #1	lb.	.074	.1225

Fast Extruding Furnace—FEF

Arovel	lb.	.06	.10
Kosmos 50/Dixie 50	lb.	.06	.10
Statex M	lb.	.06	.10
Sterling SO	lb.	.06	.10

Fine Furnace—FF

Statex B	lb.	.065	.105
Sterling 99	lb.	.065	.105

High Abrasion Furnace—HAF

Aromex	lb.	.079	.125
Continex HAF	lb.	.079	.125
Kosmos 60/Dixie 60	lb.	.079	.1175
Philblack O	lb.	.079	.119
Statex R	lb.	.079	.125
Vulcan #3	lb.	.079	.122

Medium Abrasion Furnace—MAF

Philblack A	lb.	.0575	.10

Super Abrasion Furnace—SAF

Statex 125	lb.	.11	.155

General-Purpose Furnace—GPF

Sterling V	lb.	.05	.09

High Modulus Furnace—HMF

Continex HMF	lb.	.055	.095
Kosmos 40/Dixie 40	lb.	.055	.095
Modulex	lb.	.055	.095
Statex 93	lb.	.055	.095
930	lb.	.055	.095
Sterling L, LL	lb.	.055	.095

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	$0.04	$0.08
Essex	lb.	.04	.08
Furnex	lb.	.04	.08
Gastex	lb.	.045	.085
Kosmos 20/Dixie 20	lb.	.04	.08
Pelletex	lb.	.04	.08
Sterling NS, S	lb.	.04	.08

Fine Thermal—FT

P-33	lb.	.055	

Medium Thermal—MT

Thermax	lb.	.035	
Stainless	lb.	.045	

Chemical Stabilizers

Advastab -21	lb.	1.06	1.12
Dutch Boy DS-207	lb.	.55	.57
Dyphos	lb.	.5875	.6075
Dythal	lb.	.415	.435
Normasal	lb.	.45	.47
Plumb-L-Sil A	lb.	.3025	.3225
B	lb.	.3175	.3375
C	lb.	.3425	.3625
Tribase	lb.	.2825	.3025
E	lb.	.245	.265
Stabelans	lb.	.60	1.70
Stabilizer #3, #52	lb.	2.10	2.20
#143	lb.	.80	.90
B-5	lb.	.70	.75
BC-12	lb.	.90	.95
CH-14	lb.	.65	.70
E-6-B	lb.	.90	1.00
JCX	lb.	.67	.76
L Paste	lb.	.60	.65
SN	lb.	.47	.53
V-I-N	lb.	.42	.50
Dry Powder	lb.	.75	.80
V-9	lb.	.85	.90
VL-2	lb.	1.26	1.32
-3	lb.	1.17	1.23
Vanstay H	lb.	.75	.77
HH	lb.	.98	
L	lb.	.33	.35
Witco Lead Stearate #50	lb.	.5025	
Stabilizer #70	lb.	1.25	

Colors

Black

Black Paste #25	lb.	.22	.40
BK Iron Oxides	lb.	.1175	.12
Covinyblaks	lb.	.62	1.14
Lampblack, comml	lb.	.16	.45
Superjet	lb.	.0825	.1175
Mapico	lb.	.1175	.12
MB Mineral Blacks	lb.	.0315	.0675
Stan-Tone	lb.	.45	1.20

Blue

Du Pont	lb.	1.77	4.55
Heveatex pastes	lb.	.80	1.45
Stan-Tone	lb.	1.55	1.60
Toners	lb.	.30	3.50

Brown

Brown Paste #5, #10	lb.	.35	.45
Mapico	lb.	.1275	.13
Tan	lb.	.1975	.20
Metallic brown	lb.	.035	.045
Plastics brown	lb.	.0625	.07
Sienna, burnt	lb.	.0425	.155
Raw	lb.	.045	.1325
Umber, burnt	lb.	.06	.065
Raw	lb.	.0625	.0675

Green

Chrome	lb.	.17	.40
Oxide	lb.	.375	1.20
Du Pont	lb.	1.50	3.20
G-4099, -6099	lb.	.34	.345
7599	lb.	.405	.41
GH-9869	lb.	.85	1.00
9976	lb.	.95	1.10
Heveatex pastes	lb.	.95	1.85
Stan-Tone	lb.	1.75	4.60
Toners	lb.	.35	4.00

Orange

Du Pont	lb.	2.75	
Orange Paste #13	lb.	1.35	1.50
Stan-Tone	lb.	.70	3.35
Toners	lb.	.30	1.50

Red

Antimony trisulfide	lb.	.72	.78
R. M. P. No. 3	lb.	.72	
Sulfur Free	lb.	.78	
Cadmium red lithopone	lb.	1.61	1.85
Cadmolith	lb.	1.72	2.05
Du Pont	lb.	1.32	1.80
Indian Red	lb.	.1225	.125
Iron oxide, red	lb.	.0575	.125
Mapico	lb.	.1225	.125
Red Paste #17, I-2	lb.	.95	1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.05	4.05
Toners	lb.	.25	4.15

White

Antimony oxide	lb.	$0.395	$0.405
Burgess Iceberg	ton	50.00	
Lithopone, titanated	lb.	.10	.11
Cryptone BT	lb.	.10	.11
Titanium pigments			
Rayox LW	lb.	.195	.205
R-110	lb.	.215	.225
Ti-Cal	lb.	.075	.0825
Ti-Pure	lb.	.195	.225
Titanox A-168,-LO,-MO	lb.	.21	.22
RA, RA-10	lb.	.23	.24
RCHT	lb.	.08	.085
Zopaque	lb.	.21	.22
Zinc oxide, comml.	lb.	.1475	.18
Azo ZZZ-11, -44, -55	lb.	.1475	.1575
35% leaded	lb.	.1545	.1645
50% leaded	lb.	.1575	.1675
Eagle AAA, lead free	lb.	.1475	.1575
5% leaded	lb.	.1475	.1575
35% leaded	lb.	.1545	.1645
50% leaded	lb.	.1575	.1675
Florence Green Seal	lb.	.165	.175
Red Seal	lb.	.16	.17
White Seal	lb.	.17	.18
Horsehead XX-4, -78	lb.	.1475	.1575
Kadox-15, -17, -22	lb.	.1475	.1575
-25	lb.	.17	.18
Lehigh, 35% leaded	lb.	.1545	.1645
50% leaded	lb.	.1575	.1675
Protox-166, -167	lb.	.1475	.1575
St. Joe, lead free	lb.	.1475	.1575
Zinc sulfide, comml.	lb.	.253	.263
Cryptone ZS	lb	.253	.263

Yellow

Cadmium yellow lithopone	lb.	1.20	1.21
Cadmolith	lb.	1.29	1.37
Chrome	lb.	.2925	
Du Pont	lb.	1.62	2.15
Iron oxide, yellow	lb.	.0141	.1025
Mapico	lb.	.10	.1025
Stan-Tone	lb.	1.00	1.55
Toners	lb.	.50	1.37
Yellow D	lb.	1.25	1.35

Dispersing Agents

Darvan Nos. 1, 2	lb.	.22	.30
Daxads	lb.	.08	.35
Kreelons	lb.	.15	.16
Modicols	lb.	.17	.58
Triton R-100	lb.	.12	.25

Dusting Agents

Extrud-o-Lube, conc.	gal.	1.54	
Glycerized Liquid, Lubricant, concentrated	gal.	1.48	
Lubrex	lb.	.25	.30
Mica	lb.	.07	.0775
Polymel D-Tac	lb.	.21	.22
Pyrax A	ton	13.50	
W. A.	ton	16.00	
Snow Crest Talc	ton	33.00	35.00
Vanfre	gal.	2.00	2.50

Extenders

Advagum 1098	lb.	.61	.69
B. R. S. 700	lb.	.0175	.026
B. R. T. No. 7	lb.	.0265	.0275
Burgess MX-50	ton	150.00	
Car-Bel-Ex A	lb.	.14	
Dielex B	lb.	.06	
Factice, Amberex	lb.	.29	.36
Brown	lb.	.1425	.268
Neophax	lb.	.157	.268
White	lb.	.144	.285
Mineral Rubbers			
Black Diamond	ton	38.00	40.00
Extender 600	lb.	.185	
Hard Hydrocarbon	ton	46.50	48.50
No. 38	ton	38.00	40.00
Parmr	ton	21.00	29.00
Nuba No. 1, 2	lb.	.0575	.0625
3X	lb.	.0775	.0825
Polymel Sublac Resins	lb.	.26	.30
Rubber substitute, brown	lb.	.137	.2625
White	lb.	.156	.292
Stan-Shells	ton	35.00	73.00
Synthetic 100	lb.	.41	

Fillers, Inert

Barytes, floated, white	ton	37.60	61.75
Off-color, domestic	ton	19.00	20.00
No. 1	ton	37.60	53.60
2	ton	35.60	51.60
Blanc fixe	ton	90.00	130.00
Clays			
Aiken	ton	14.00	
Albacar	ton	50.00	55.00
Aluminum Flake	ton	16.00	22.00
#5	ton	21.00	
Champion	ton	14.00	
Crown	ton	14.00	33.00
GK Soft Clay	ton	11.00	
Hi-White R	ton	13.50	33.00
Hydratex R	ton	28.00	
Paragon	ton	13.50	31.50
McNamee	ton	13.50	
RX-43	ton	33.00	
Stan-Clay	ton	28.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00	33.00
W-1291 English	ton	53.00	55.00
Witco #1	ton	14.00	30.00
#2	ton	13.50	30.00
Cryptone BA, CB, MS	lb.	$0.08	$0.0825
Flocks			
Cotton, dark	lb.	.095	.112
Dyed	lb.	.55	.60
White	lb.	.13	.33
Fabrifil X-24-G	lb.	.095	
X-24-W	lb.	.135	
Filfloc 6000	lb.	.16	
F-40-900	lb.	.105	
Solka-Floc	lb.	.07	.16
Kalite	ton	50.00	65.00
Lithopone, comml.	lb	.075	.085
Albalith	lb.	.075	.085
Astrolith	lb.	.06¾	.0675
Eagle	lb.	.0725	.075
Sunolith	lb.	.079	.089
Mica	lb.	.07	.0775
Millical	ton	32.50	47.50
No. 1 Silica	ton	22.00	40.00
Non-Fer-Al	ton	25.00	40.00
Purecal D	ton	50.00	65.00
M	ton	45.00	65.00
T	ton	110.00	125.00
Pyrax A	ton	12.50	
W. A.	ton	15.00	
SL Slate Flour	ton	17.00	25.00
Stan-White	ton	8.50	9.45
Super-White Silica	ton	23.00	42.00
Suspenso	ton	30.00	45.00
Terra Alba 1319	ton	27.00	
Ti-Cal	lb.	.0675	
Whiting, limestone	ton	6.00	15.00
Calcite	ton	20.00	
Paxinosa	ton	10.00	18.00
Witco	ton	8.50	

Finishes

Black-out	gal.	4.50	8.00
Flocks			
Cotton, dark	lb.	.095	.112
Dyed	lb.	.55	.60
White	lb.	.13	.33
Rayon, colored	lb.	.90	1.50
White	lb.	.75	1.25
Rubber lacquer, clear	gal.	1.00	2.00
Colored	gal.	2.00	3.50
Shoe varnish	gal.	1.45	
Talc	ton	14.00	35.00
Nytals	ton	25.00	36.00
Wax, Bees	lb.	.46	.71
Carnauba	lb.	.96	1.28
Montan	lb.	.31	.32
No. 118, colors	gal.	.86	1.41
Neutral	gal.	.76	1.31
Van Wax	gal.	1.45	1.50

Latex Compounding Ingredients

Accelerator 552	lb.	1.80	
J-127, -132	lb.	1.00	1.15
Aerosol	lb.	.35	
AgeRite Dispersions	lb.	.60	2.25
Alcogum AN-10	lb.	.085	
Amberex Solutions	lb.	.1675	.18
Antifoam J-114	lb.	3.25	3.45
P-242	lb.	.24	.35
Antioxidant J-105	lb.	1.90	2.05
-126, -139	lb.	1.45	1.60
-137, -140	lb.	.55	.70
-138	lb.	1.05	1.20
-191	lb.	1.10	1.20
Anti-Webbing Agent X-452	lb.	.75	.90
Aquablaks	lb.	.08	.1775
Aquarex D	lb.	.80	
L Paste	lb.	.94	
MDL Paste	lb.	.33	
ME	lb.	.97	
NS	lb.	.60	
SMO	lb.	.50	
WA Paste	lb.	.28	
Areskap 50	lb.	.30	.38
100, dry	lb.	.60	.72
Aresket 240	lb.	.30	.38
300, dry	lb.	.60	.72
Aresklene 375	lb.	.42	.57
Black No. 25, dispersed	lb.	.22	
Casein	lb.	.275	.385
Coagulant P-379	gal.	1.30	1.90
-392	gal.	1.55	2.15
CW-12	lb.	.85	
37	lb.	.70	
Darex Copolymer Latices	lb.	.365	.50
Dispersed Sulfur No. 2	lb.	.10	.12
Factice dispersions	lb.	.26	.42
Gelling Agent P-397	lb.	.34	.37
Habuco Resin Emulsion			
#226	lb.	.227	.232
2246-A	lb.	.275	.28
3408-B	lb.	.18	.19
Laton L	lb.	.075	.0775
Ludox	lb.	.1675	.1925
Marmix	lb.	.41	.48
Micronex, colloidal	lb.	.06	.07
Pliolite Latex 150, 190	lb.	.32	.41
170	lb.	.37	.46
Resin Emulsion A-2	lb.	.16	.25
A-155TH	lb.	.195	.265
P-370	lb.	.125	.175
X-210	lb.	.12	.32
Resin V	lb.	.13	
Santomerse D	lb.	.44	.65
S	lb.	.13	.25
Stablex A	lb.	.80	1.10
B, G	lb.	.50	.95
K	lb.	.27	.35
P	lb.	.35	.50
T	lb.	.17	.22
Sulfur dispersions	lb.	.12	.25

Mold Lubricants

Aquarex D	lb.	$0.76	
L Paste	lb.	.85	
MDL Paste	lb.	.30	
WA Paste	lb.	.25	
Carbowax compounds	lb.	.29	/ $0.295
Colite Concentrate	gal.	.90	/ 1.15
ELA	lb.	.80	
DC Mold Release Fluid	lb.	4.14	/ 6.00
Emulsion Nos. 35, 35A, 35B	lb.	1.68	/ 3.50
DC 7	lb.	6.20	/ 6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.48	
Lubrex	lb.	.25	/ .30
Lubri-Flo	gal.	10.00	/ 12.05
Mold Paste	lb.	.25	
Monten Wax	lb.	.57	
Para Lube	lb.	.046	/ .048
Rubber-Glo	gal.	.94	/ .97
Soap, Hawkeye	lb.	1.35	/ 1.45
Purity	lb.	.155	/ .165
Sodium stearate	lb.	.43	/ .44
Stearite	lb.	.095	/ .10
Vanfre	gal.	2.50	/ 3.00

Odorants

Alamasks	lb.	.75	/ 6.50
Curodex 19	lb.	4.75	
188	lb.	5.75	
198	lb.	6.75	
Rodo No. 0	lb.	4.00	/ 4.50
No. 10	lb.	5.00	/ 5.50

Plasticizers and Softeners

Akroflex C	lb.	.61	/ .63
Aro Lene #1980	lb.	.10	/ .12
Baker AA Oil	lb.	.27	/ .33
Crystal O Oil	lb.	.285	/ .345
Processed oils	lb.	.29	/ .325
Bardol	lb.	.025	/ .035
639	lb.	.025	/ .0425
B	lb.	.0575	/ .06
Bondogen	lb.	.55	/ .60
BRC 20	lb.	.015	/ .016
30	lb.	.0115	/ .02
521	lb.	.019	/ .02
B. R. H. No. 2	lb.	.02	/ .029
B. R. S. 700	lb.	.0175	/ .026
B. R. T. No. 7	lb.	.0265	/ .0275
B. R. V.	lb.	.035	/ .0515
Bunarex Liquid	lb.	.0425	/ .0555
Resins	lb.	.065	/ .1225
Bunnatol G. S.	lb.	.40	/ .505
Butac	lb.	.125	/ .135
BxDC	lb.	.40	/ .41
Cabflex DI-BA	lb.	.42	/ .4475
-OA	lb.	.435	/ .4625
-OP	lb.	.40	/ .4275
Carbonex	lb.	.0325	/ .0375
664	lb.	.0375	/ .0425
645	lb.	.036	/ .0385
S	lb.	.0425	/ .0475
S Plastic	lb.	.041	/ .046
Chlorowax 40	lb.	.16	/ .17
Contogums	lb.	.0875	/ .111
Cumar EX	lb.	.0525	
MH	lb.	.065	/ .11
V	lb.	.0975	/ .1275
Dielex B	lb.	.06	
Dipolymer Oil	gal.	.33	/ .38
Dispersing Oil No. 10	lb.	.055	/ .0575
Duraplex C-50 LV, 100%	lb.	.25	/ .295
Dutrex 6	lb.	.025	/ .035
Galex W-100	lb.	.135	/ .1725
W-100D	lb.	.1325	/ .17
Gilsowax B	lb.	.09	/ .11
Good-rite GP-261	lb.	.40	/ .52
GP-263	lb.	.45	/ .585
Harflex 500	lb.	.45	/ .4775
Heavy Resin Oil	lb.	.0225	/ .0375
HSC-13	lb.	.27	/ .30
Indonex	gal.	.11	/ .19
Morflex 100, 110	lb.	.425	/ .4525
200, 210	lb.	.7775	/ .805
Nebony resins	lb.	.04	/ .045
Nevillac	lb.	.28	/ .55
Neville R. Resins	lb.	.13	/ .35
Nevinol	lb.	.20	
Nevoll	lb.	.025	/ .035
Nevtex resins	lb.	.11	/ .48
No. 1-D heavy oil	lb.	.055	/ .065
Palmalene	lb.	.15	
Paraflex BN-1	lb.	.185	/ .225
Para Flux, regular	gal.	.1925	/ .2125
No. 2016	gal.	.165	/ .24
2332	gal.	.11	
Para Lube	lb.	.046	/ .048
Resins	lb.	.04	/ .045
Paradene Resins	lb.	.065	/ .075
Peptizene #2	lb.	.90	
Pepton 22	lb.	.745	/ .775
Picco Resins	lb.	.13	/ .185
480 Oilproof Series	lb.	.18	/ .23
S. O. S.	gal.	.29	/ .34
Piccocizers	lb.	.04	/ .068
Piccolastic Resins	lb.	.1855	/ .34
Piccolyte Resins	lb.	.185	/ .25
Piccoumaron Resins	lb.	.07	/ .185
Piccovars	lb.	.145	/ .20
Piccovol	lb.	.025	/ .038
Pictar	gal.	.25	/ .30
Pigmentar	gal.	.041	/ .0678
Pigmentaroil	gal.	.041	/ .0678
Plastender S	lb.	.04	/ .0425
Plasticizer 35	lb.	$0.205	/ $0.24
36	lb.	.305	/ .34
42	lb.	.34	/ .40
B	lb.	.35	/ .45
DP-520	lb.	.435	/ .455
MT-511	lb.	.535	/ .565
ODN	lb.	.32	/ .37
PX series	lb.	.385	/ .75
SC	lb.	.61	/ .69
Plastogen	lb.	.0775	/ .08
Plastone	lb.	.22	/ .30
Polycizers	lb.	.40	/ .4775
Polymel 6	lb.	.07	/ .075
7	lb.	.14	
D Resin	lb.	.253	/ .24
Gilsowax B	lb.	.0925	/ .1025
Resin C-130	lb.	.195	/ .205
PT67 Light Pine Oil	gal.	.50	/ .60
101 Pine Tar Oil	lb.	.041	/ .0534
400 Light Pine Tar	lb.	.041	/ .0534
600 Med. Pine Tar	lb.	.041	/ .0534
R-19, R-21 Resins	lb.	.1075	
Reogen	lb.	.1325	/ .135
Resin C pitch	lb.	.02	/ .0285
R6-3	lb.	.38	/ .40
Resinex	lb.	.0325	/ .0375
L-4	lb.	.0225	/ .03
Rosin Oil, Sunny South	gal.	.58	/ .875
RPA No. 2	lb.	.75	
No. 3 RO	lb.	.49	
5	lb.	.57	
RSN Flux	gal.	.10	/ .19
Rubber Oil B-5	lb.	.0225	/ .0355
Rubberol	lb.	.2575	
Santicizer 107	lb.	.40	/ .4775
140	lb.	.3525	/ .43
141	lb.	.40	/ .4775
160	lb.	.33	/ .4075
Seedine	lb.	.1485	/ .1705
Softener #20	gal.	.10	/ .20
Solvenol	gal.	.50	/ .61
Special Rubber Resin 100	lb.	.1675	/ .2175
Staybelite Resin	lb.	.125	
Starex Beads	lb.	.14⅞	/ .15⅞
Starite	lb.	.095	/ .10
Syn-Tac	gal.	.33	/ .35
Synthol	lb.	.2475	
Thiokol TP-90B	lb.	.59	/ .69
-95, -98	lb.	.65	
TR-11	lb.	.035	
Turgum S	lb.	.1075	/ .1175
Tysonite	lb.	.215	/ .2225
X-1 Resinous Oil	lb.	.021	/ .0275
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Bardol	lb.	.025	/ .035
639	lb.	.025	/ .0425
B	lb.	.0575	/ .06
B. R. H. No. 2	lb.	.02	/ .029
B. R. T. No. 4	lb.	.0225	/ .0235
B. R. V.	lb.	.035	/ .0515
BWH-1	lb.	.14	
Dipolymer Oil	gal.	.33	/ .43
Dispersing Oil No. 10	lb.	.055	/ .0575
Heavy Resin Oil	lb.	.0225	/ .0375
LX-759	gal.	.16	/ .165
-774, -777	gal.	.23	/ .33
No. 1621	lb.	.025	/ .035
3186	gal.	.28	/ .295
Picco 6535	gal.	.25	/ .30
C-33	gal.	.215	/ .315
-42	gal.	.23	/ .33
D-4	gal.	.27	/ .37
E-5	gal.	.25	/ .35
Q-Oil	gal.	.286	/ .36
PT 101 Pine Tar Oil	lb.	.041	/ .034
150 Pine Solvent	gal.	.44	/ .553
Reclaiming Oil #3186	gal.	.28	/ .385
-G	gal.	.25	/ .365
RR-10	lb.	.35	
S. R. O.	lb.	.015	/ .0225
X-1 Resinous Oil	lb.	.021	/ .0275

Reinforcers, Other Than Carbon Black

BRC 20	lb.	.015	/ .016
30	lb.	.0115	/ .02
521	lb.	.019	/ .02
Bunarex resins	lb.	.065	/ .1225
Calcene NC	ton	72.50	/ 92.50
TM	ton	75.00	/ 95.00
Calco S. A.	lb.	.85	/ .88
Carbonex	lb.	.0325	/ .0375
644	lb.	.0375	/ .0425
645	lb.	.036	/ .0385
S	lb.	.0425	/ .0475
S Plastic	lb.	.041	/ .046
Clays			
Aiken	ton	14.00	
Aluminum Flake	ton	23.50	/ 60.00
No. 5	ton	21.85	/ 36.00
22	ton	17.00	/ 22.50
Buca	ton	40.00	
Burgess Iceberg	ton	50.00	
Pigment No. 20	ton	35.00	
30	ton	37.00	
Polyclay	ton	45.00	
Catalpo	ton	30.00	
Crown	ton	14.00	/ 33.00
Dixie	ton	14.00	
Hydratex R	ton	28.00	
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50	/ 31.50
Pigment No. 33	ton	30.00	
Suprex	ton	14.00	/ 32.00
Witco No. 1	ton	14.00	/ 30.00
No. 2	ton	13.50	/ 30.00
Clearcarb	lb.	.1175	/ .1225
Cumar EX	lb.	$0.0525	
MH	lb.	.065	/ $0.1175
V	lb.	.0975	/ .1275
Darex Copolymers	lb.	.38	/ .44
G Resin	lb.	.08	
Good-rite Resin 50	lb.	.41	/ .44
Hi-Sil	lb.	.10	/ .115
Kralac A	lb.	.43	/ .54
Magnesium oxide	lb.	.05	/ .34
Marbon resins	lb.	.41	/ .48
Multiflex MM	ton	110.00	/ 125.00
Neville R. Resins	lb.	.10	/ .155
Para Resins 2457, 2718	lb.	.04	/ .45
Pico Resins	lb.	.13	/ .185
Piccolyte Resins	lb.	.185	/ .25
Piccoumaron Resins	lb.	.07	/ .185
Piccovars	lb.	.145	/ .20
Pliolite S-3, -6, -6B	lb.	.42	/ .49
S-6C	lb.	.52	/ .59
S-Master batches	lb.	.44	/ .75
PS-60 Resin	lb.	.35	
Purecal U	ton	120.00	/ 135.00
Resin C Pitch	lb.	.02	/ .0285
Resinex	lb.	.0325	/ .0375
Rubber Resin LM-4	lb.	.28	/ .35
S-Polymers	lb.	.44	
Silene EF	ton	120.00	/ 140.00
Silvacons	ton	55.00	/ 85.00
Super Multifex	ton	160.00	/ 175.00
Witcarb R	ton	105.00	/ 120.00
R-12	ton	45.00	/ 66.00
Zinc oxide, commercial†	lb.	.1475	/ .18

Retarders

Cumar RH	lb.	.105	
Delac J	lb.	.55	/ .60
E-S-E-N	lb.	.35	/ .37
Good-rite Vultrol	lb.	.58	/ .60
R-17 Resin	lb.	.1075	/ .36
Retarder ASA	lb.	.57	
PD	lb.	.35	/ .37
TCM	lb.	.65	
W	lb.	.43	
Retardex	lb.	.47	/ .50
RM	lb.	1.25	
Thionex	lb.	1.25	

Solvents

2-50-W Hi-Flash Solvent	gal.	0.41	
3-BX Naphtha	gal.	.37	
Bondogen	lb.	.55	/ .060
Cosols	gal.	.37	/ .48
Dichloro Pentanes	lb.	.04	/ .07
Dipentene DD	gal.	.445	/ .68
GVL	lb.	1.00	
LX-572 Oil	gal.	.27	/ .32
-748 Solvent	gal.	.16	/ .23
Penetrell	gal.	.445	/ .68
Picco Hi-Solv Solvents	gal.	.17	/ .24
Pine Oil D.D.	gal.	.755	/ .955
PT 150 Pine Solvent	gal.	.44	/ .55
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	
Tollac	gal.	.195	/ .25

Synthetic Resins

Geon Latices (dry wt.)	lb.	.43	/ .57
Paste Resins	lb.	.38	/ .59
Plastics	lb.	.42	/ .77
Polyblend	lb.	.475	/ .575
Polyvinyl resins	lb.	.38	/ .70
Marvinol VR-10, -20	lb.	.36	/ .52

Synthetic Rubber and Latices

Butaprene Latex (dry wt.)			
NL types	lb.	.47	/ .52
NXM types	lb.	.55	/ .60
Butaprene NAA	lb.	.54	/ .55
NF	lb.	.49	/ .50
NL	lb.	.50	/ .51
NXM	lb.	.58	/ .59
Chemigum 30N4NS, 50N4NS	lb.	.50	/ .57
N1NS	lb.	.64	/ .71
N3NS	lb.	.58	/ .65
Latex (dry wt.)			
101-A, -AX, -E	lb.	.32	/ .41
200	lb.	.425	/ .525
235-A, -B	lb.	.50	/ .60
245-A, -B	lb.	.425	/ .525
Hycar OR-15, -15EP	lb.	.58	/ .59
-15 Powdered	lb.	.621	/ .63
-25, -25 EP	lb.	.50	/ .51
-25 NS	lb.	.51	/ .52
-25 ST	lb.	.61	/ .62
OS-10	lb.	.55	/ .56
Hycar Latex (dry wt.)			
OR-15 types	lb.	.55	/ .60
-25 types	lb.	.47	/ .52
Neoprene Latex (dry wt.)			
Type 571, 842, 842-A	lb.	.35	/ .46
572, 700	lb.	.36	/ .47
601, 601-A	lb.	.38	/ .49
735	lb.	.36	/ .47
Neoprene Type AC, CG	lb.	.50	/ .52
E	lb.	.65	/ .68
FR	lb.	.80	/ .83
KNR	lb.	.75	/ .78
GN, GN-A, S	lb.	.38	/ .41
RT, W	lb.	.40	/ .43
Paracril 18-80	lb.	.60	/ .61
AJ	lb.	.485	/ .495

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

Effective July 1, 1947

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.25 per line (ten words)	Light face type 40c per line (ten words)	Light face type $1.00 per line (ten words)
Bold face type $1.60 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.40 per line (eight words)
Allow nine words for keyed address.		*Letter replies forwarded without charge, but no packages or samples.*

Address All Replies to New York Office at 386 Fourth Avenue, New York 16, N. Y.

SITUATIONS OPEN

RUBBER TECHNICIAN thoroughly experienced in rubber compounding for use in production of rubberized curled hair. Salary open. Excellent opportunity with large established manufacturer.

ADDRESS BOX NO. 1134,
c/o INDIA RUBBER WORLD

RUBBER CHEMIST: AT LEAST THREE TO FIVE YEARS EXperience in the development and manufacture of rubber products. Must have good knowledge of compounding, factory processing and laboratory control. State education, experience, age, and salary requirements in reply. Address Box No. 1121, care of INDIA RUBBER WORLD.

PROGRESSIVE WEST COAST MANUFACTURER REQUIRES chemist or chemical engineer having experience in compounding and production of PVC plastisol articles by rotational casting method. Experience in rubber technology also desirable. Write giving age, recent photo, complete educational background and industrial experience, salary requirements, etc. Address Box No. 1122, care of INDIA RUBBER WORLD.

ENGINEERS—Design, Process, and Project. Experience in paper converting, calendering, building materials, textiles, or automatic machinery. PABCO PRODUCTS INC., Emeryville 8, California (Bay Area).

HAVE EXCELLENT OPPORTUNITY FOR CHEMIST EXPERIenced in sponge rubber. Medium-size progressive company in Midwest. All information strictly confidential. Our employes know of this ad. Address Box 1123, care of INDIA RUBBER WORLD.

RUBBER CHEMIST OR COMPOUNDER WANTED: WITH EXperience or training, preferably with knowledge of chemically blown sponge rubber. Development and plant process control work. Company located in small town. Address Box No. 1125, care of INDIA RUBBER WORLD.

RUBBER CHEMIST WITH EXPERIENCE COMPOUNDING soles and heels. Address Box No. 1126, care of INDIA RUBBER WORLD.

INCREASED PRODUCTION FACILITIES HAVE CREATED AN opening in our Development Department for an experienced industrial hose chemist or development man. This position offers exceptional growth opportunities to a man who has the experience and initiative to start and follow through on all phases of hose development. If you are ready to "step up," send us your qualifications with the assurance that all communications will be held in strict confidence. E. M. Ikirt, General Manager, REPUBLIC RUBBER DIVISION, LEE RUBBER & TIRE CORP., Youngstown 1, Ohio.

WANTED: SALES REPRESENTATION BY MANUFACTURERS' agent specializing in molded rubber parts, custom and production rubber molding. KEYSTONE MOUNTS CORP., 501 Amherst St., Buffalo, N.Y.

CHEMIST: MAN WITH CHEMICAL DEGREE AND EXPERIence in the proofing of fabrics for position with manufacturer of rubber products and waterproof materials. Write supplying information regarding education and experience to Box No. 1133, care of INDIA RUBBER WORLD.

CHEMIST: LARGE MIDWEST WELL-ESTABLISHED ORGANization desires services of rubber chemist, with compounding experience preferable. Traveling Midwest area necessary. Trade contacts desirable. Excellent chance for advancement. Reply in detail stating age, experience, education, references, salary desired, etc. Address Box No. 1137, care of INDIA RUBBER WORLD.

WANTED: RUBBER CHEMIST. EXCELLENT OPPORTUNITY for chemist with several years' experience in latex and rubber compounding for development work with chemical company in Pittsburgh area. Give complete details of education, desired salary, availability, and references. All replies will be considered promptly and held confidential. Address Box No. 1138, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

FRENCH RUBBER FACTORY NEAR PARIS DESIRES U. S. chemical engineer experienced in latex product manufacture, with complete knowledge of manufacture of latex protective gloves for use in electrical and chemical industries. Duration of position up to individual. Write ÉTUDES JEANSON, 4 Rue Robespierre, Paris, France.

SITUATIONS WANTED

OPERATIONS MANAGER, RESEARCH AND PRODUCT DE-velopment engineer, chemist, with 30 years' experience in application plastics, rubber, latex, fabric coating and allied fields. Diversified chemical, mechanical, and consulting experience. Patents registered. Available short notice. Address Box No. 1119, care of INDIA RUBBER WORLD.

EXPERIENCED SALESMAN COVERING RUBBER, PLASTIC, and paint industries in Ohio desires additional lines on commission. Address Box No. 1120, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER WITH MANY YEARS OF RUBBER factory experience in processing and compounding desires production problems. Apply to HARRY A. ATWATER, 19 Sagamore Park, West Medford, Mass.

ASST. SALES MANAGER, SALES ENGINEER FOR INDUSTRIAL molded and extruded products; graduate Mechanical Engineer; 17 years' rubber sales experience, 8 spent in molded goods; broad knowledge products, management, advertising, costs; seeks permanent position. Address Box No. 1130, care of INDIA RUBBER WORLD.

REG. CHEM. ENG. (MASS.) 14 YEARS' EXPERIENCE LATEX and synthetic resins in paper and textile saturants and coatings. Available for consultant work vicinity of Springfield, Mass. Address Box No. 1131, care of INDIA RUBBER WORLD.

CHEMIST-ENGINEER: EXCELLENT EXPERIENCE ADMINIStrative laboratory, research and development compounding, raw materials, specifications, factory; in rubber products and plastics: major concerns (16 yrs.). Products: sponge rubber, mechanicals, tubes, rubber and vinyl flooring, tires, and vinyl. Desire technical or production executive position offering increased responsibility. Address Box No. 1132, care of INDIA RUBBER WORLD.

CHEMIST AND EXECUTIVE EXPERT IN ADHESIVES, CAN take charge of production, research, development, sales engineering. Address Box No. 1135, care of INDIA RUBBER WORLD.

EXECUTIVE—EXTENSIVE EXPERIENCE TRADING, EXPORTing, importing, rubber, latex, tires, tubes & kindred products. Represented American tire companies abroad. Will consider position where experience important. Highest references. Linguist. Location immaterial. Address Box No. 1136, care of INDIA RUBBER WORLD.

TECHNICAL SALES POSITION DESIRED BY CHEM. ENGINEER with wide experience in product development, compounding, engineering sales, and with government materials specifications. Address Box No. 1139, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—BALL & JEWELL NO. 1½ ROTARY CUTTER, stainless steel. 3 Mikro pulverizers #1-SH, #2-SI, #2-TH. 2 Kux rotary pellet presses. 6 Stokes rotary pellet presses. Read 600-gal. jacketed ribbon mixer. Large stock stainless steel tanks and kettles. PERRY EQUIPMENT CORP., 1424 N. 6th St., Philadelphia 22, Pa.

ACCUMULATOR AND PUMPS

1—7" x 6' inverted accumulator, Mf'd. by Chas. Elmes Eng. Wks., 37" dial shell. Takes 11,000# ballast for 300# W.P. Max. Work. height 15'-11", 2" pipe conn. to spindle, new 1943.

2—Worthington 4½" x 6" vert. triple single-acting pumps. 300# P.S.I., motor drive, less motors, bronze trimmed, new 1943.

DALTON SUPPLY CO.

2829 Cedar St. **Phila. 34, Pa.**

Paracril			
B, BJ	lb.	$0.50	$0.51
BV	lb.	.51	.52
C	lb.	.58	.59
CS, CV	lb.	.59	.60
Paraplex X-100	lb.	1.00	
Silastic	lb.	2.35	4.05
Thiokol LP-2, -3	lb.	.96	
-8	lb.	1.25	
PR-1	lb.	1.95	
Type A	lb.	.47	
FA	lb.	.64	
ST	lb.	1.00	
Thiokol Latex (dry wt.)			
Type MF	lb.	.85	
MX	lb.	.70	
WD-2	lb.	.92	
-6	lb.	.70	

Tackifiers

Bunarex resins	lb.	.065	.1225
Chlorowax 70	lb.	.18	.19
Contogums	lb.	.0875	.11
Galex W-100	lb.	.155	.1925
W-100D	lb.	.1525	.19
Indopol H-100	gal.	.85	1.00
H-300	gal.	1.00	1.16
Natac	lb.	.12	.13
Nevindene	lb.	.125	.155
Picco resins	lb.	.13	.185
Piccolastic resins	lb.	.1855	.34
Piccolyte resins	lb.	.185	.25
Piccoumaron resins	lb.	.07	.185
Staybelite Resin	lb.	.06	.065

Synthetic 100	lb.	$0.41	
Synthol	lb.	.2475	
Vistac #1	lb.	1.00	$1.16
A	lb.	.215	.2725
P	lb.	.18	.235

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.585	
G-M-F #113	lb.	.88	
G-M-F-	lb.	2.585	
#117	lb.	.88	
Litharge, commercial	lb.	.1775	.1885
Eagle, sublimed	lb.	.1875	.1885
National Lead	lb.	.1875	.1885
Magnesium oxide	lb.	.31	
Red lead, commercial	lb.	.1875	.2025
Eagle	lb.	.1975	
National Lead	lb.	.1975	
Sulfasan R	lb.	1.50	
Sulfur flour, comml.	100 lbs.	2.05	2.20
Calco	100 lbs.	2.15	7.50
Crystex	lb.	.195	
Insoluble 60	lb.	.125	.13
Rubbermakers	100 lbs.	2.25	3.80
Stauffer	lb.	.0215	.0335
Telloy	lb.	2.50	
Vandex	lb.	3.50	
Vultac No. 2	lb.	.47	.6025
3	lb.	.51	.655
White lead silicate	lb.	.158	.2125
Eagle	lb.	.195	.2125
National Lead	lb.	.158	.168

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	April, 1952	
	Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	174,939,170	$71,497,007
Latex	10,798,739	4,402,416
Guayule	123,200	27,927
Balata	108,950	31,239
Crude chicle	365,628	200,301
Jelutong or Pontianak	524,731	409,076
Gutta percha	72,733	41,391
Synthetic rubber	2,956,137	799,932
Reclaimed rubber	191,677	11,869
Scrap rubber	1,534,369	67,399
TOTALS	191,615,334	$77,488,557
MANUFACTURED		
Rubber tires		
Auto, etc. *no.*	8,579	$290,977
Bicycle *no.*	1,961	13,444
Other *no.*	472	9,112
Inner tubes: auto, etc. *no.*	158	276
Footwear: boots *prs.*	11,760	37,562
Shoes and overshoes, *prs.*	43,223	27,666
Rubber-soled canvas shoes *prs.*	7,177	7,031
Athletic balls: golf *no.*	8,604	2,608
Tennis *no.*	37,800	7,879
Other *no.*	101,508	19,718
Toys	....	26,053
Hard rubber goods		
Combs *no.*	74,880	6,601
Sundries	....	1,886
Other	....	47,630
Rubberized printing blankets *lbs.*	2,082	4,212
Rubber and cotton tape *lbs.*	1,085	552
Packing *lbs.*	7,003	12,726
Gaskets and valve packing	....	2,155
Belting *lbs.*	529	2,002
Hose and tubing	....	5,131
Drug sundry sets *prs.*	40,320	9,154
Nipples and pacifiers *gr.*	2,362	2,871
Instruments *doz.*	1,048	7,627
Other rubber products	....	5
Gutta percha manufactures *lbs.*	6,034	7,430
Rubber heels and soles *lbs.*	20	85
Bands *lbs.*	2,829	3,189
Synthetic rubber products	....	24
Other soft rubber goods	....	122,255
TOTALS	....	$679,961
GRAND TOTALS, ALL RUBBER IMPORTS	....	$78,168,518

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

Exports of Domestic Merchandise

	April, 1952	
	Quantity	Value
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	206,059	$87,893
Balata, gutta percha, etc.	5,747	5,790
Synthetic rubbers		
GR-S type	3,387,264	886,637
Butyl	1,700	850
Neoprene	1,446,321	598,040
Nitrile type	534,159	283,968
Other	39,198	55,200
Reclaimed rubber	2,397,302	212,973
Scrap rubber	1,673,245	52,913
TOTALS	9,690,995	$2,184,264
MANUFACTURED		
Rubber cement *gals.*	52,956	$118,606
And rubberized fabric *sq. yds.*	135,078	102,197
Clothing	....	235,899
Footwear		
Boots and shoes *prs.*	17,318	65,787
Rubber-soled canvas shoes *prs.*	20,837	38,093
Heels *doz. prs.*	53,292	61,735
Soling and toplift sheets *lbs.*	543,808	148,445
Gloves and mittens *doz. prs.*	12,315	61,496
Rubbe drug sundries	....	$181,575
Toys, balls, novelties, etc.	....	49,197
Hard rubber goods		
Battery boxes *no.*	24,763	53,531
Other electrical *lbs.*	107,889	88,056
Other	....	28,104
Rubber tires and casings		
Truck and bus *no.*	77,736	4,587,528
Auto and motorcycle *no.*	49,088	699,784
Aircraft *no.*	1,949	98,799
Off-the road *no.*	14,365	1,800,606
Farm tractor *no.*	7,712	345,406
Farm implement *no.*	1,532	42,503
Other *no.*	11,245	111,971
Inner tubes		
Auto *no.*	29,837	58,975
Truck and bus *no.*	58,306	272,329
Aircraft *no.*	2,146	16,902
Other *no.*	38,997	89,034
Solid tires, truck and industrial *no.*	1,749	46,354
Tire repair materials		
Camelback *lbs.*	582,720	187,196
Other *lbs.*	400,957	317,766
Tape, except medical and friction *lbs.*	63,684	51,339
Belting: V-type fan belts *lbs.*	86,893	125,164
Transmission		
V-belts *lbs.*	101,853	267,026
Flat belts *lbs.*	30,538	56,126
Conveyor and levitator *lbs.*	109,319	114,172
Other *lbs.*	4,571	12,284
Hose		
Molded and braided *lbs.*	438,364	386,365
Wrapped and hand built *lbs.*	176,438	180,003
Other hose and tubing *lbs.*	119,730	128,758
Packing		
Sheet type *lbs.*	55,842	50,217
Other *lbs.*	144,225	192,206
Tiling and flooring *lbs.*	59,572	19,584
Mats and matting *lbs.*	291,610	80,939
Thread: bare *lbs.*	5,882	12,511
Textile covered *lbs.*	7,764	28,335
Compounded rubber for further manufacture *lbs.*	1,110,148	349,788
Other rubber manufactures	....	526,956
TOTALS	....	$12,489,645
GRAND TOTALS, ALL RUBBER EXPORTS	....	$14,673,909

Reexports of Foreign Merchandise

	Quantity	Value
UNMANUFACTURED, Lbs.		
Crude rubber	190,233	$103,819
Balata, gutta percha, etc.	13,783	9,009
Synthetic rubber: GR-S type	3,096	1,772
TOTALS	207,112	$114,600
MANUFACTURED		
Rubber gloves and mittens *doz. prs.*	160	$548
Drug sundries	....	150
Toys, balls, novelties, etc.	....	409
Hard rubber goods	....	108
Other rubber products	....	2,066
TOTALS	....	$3,280
GRAND TOTALS, ALL RUBBER REEXPORTS	....	$117,880

United States Rubber Statistics—May, 1952

	New Supply			Distribution		Month-End
	Production	Imports	Total	Consumption	Exports	Stocks
Natural rubber, total	0	55,764	55,764	32,402	130	54,655
Latex, total	0	3,409	3,409	3,890	0	9,173
Rubber and latex, total	0	59,173	59,173	36,292	130	63,828
Synthetic rubbers, total	*53,462 †7,083	1,592	62,137	66,439	2,326	153,339
GR-S types‡	*46,021 †31	1,353	47,405	54,480	1,296	118,634
Butyl	*7,441	239	7,680	6,174	0	21,925
Neoprene‡	†5,648	0	5,648	4,647	680	9,065
Nitrile types‡	†1,404	0	1,404	1,138	350	3,715
Natural rubber and latex, and synthetic rubbers, total	60,545	60,765	121,310	102,731	2,456	217,167
Reclaimed rubber, total	23,142	125	23,267	22,314	1,078	40,169
GRAND TOTALS	83,687	60,890	144,577	125,045	3,534	257,336

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

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FOR SALE: 1—THROPP 60" RUBBER MILL WITH 100 H.P. MOtor: 1— Farrel-Birmingham self-contained 6" x 13" 3-roll Laboratory Calender, 7½ H.P. motor; 4—Bolling 18" x 18" 5-opening Hydraulic Presses; 1—Farrel 20" x 48" Rubber Mill, M.D.; 1—Colton #5½ Pre-form Machine, motor driven. Also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters. Send us your inquiries. Also your list of Idle Equipment. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 38, N. Y. BArclay 7-0600.

RUBBER MILLS

2 Farrel-Birmingham 18" x 42", 13½" bearings, with a 75 h.p. synch. motor. 1 calender 6" x 12" w.c. rolls, motor driven. DALTON SUPPLY CO., 2829 Cedar St., Philadelphia 34, Pa.

BALDWIN-SOUTHWARK PRESS. 250-TON BALDWIN-SOUTHwark 2-OPG hydraulic press with 24" platens, 19" cylinder, and 10" stroke, complete with Burnham Simplex steam pump. ABBE PEBBLE MILL. Abbe Engineering Co. 35-gallon pebble mill, arranged for belt drive. FARLEY & LOETSCHER MFG. CO., Dubuque, Iowa.

PRICED RIGHT—JUST RECONDITIONED—FOR SALE—CALender 18" x 54", 3-roll, with 125 h.p. motor. Even and friction gears—electrical equipment and cooling drum. Can be seen near Boston. Address Box No. 1128, care of INDIA RUBBER WORLD.

FOR SALE: NEW LABORATORY MILLS AND CALENDERS; also used Banbury Mixers, Mills, Calenders, Extruders, Tubers, Hydraulic Presses, Vulcanizers. Send us your inquiries. EAGLE INDUSTRIES, INC., 112 Washington Street, New York 6, N. Y. DIgby 4-8364.

REBUILT BANBURY BODIES AND PARTS FOR SALE OR INterchange. Sizes #9 and #11 available. Parts include rotors, rotor collars, door tops and rings. We rebuild all sizes of Banburys, and our "Pre-Plan" method saves your production time. Write for prices and details. INTERSTATE WELDING SERVICE, Offices, Metropolitan Building, Akron 8, Ohio.

FOR SALE: FARREL 16" X 48" AND 15" X 36", 2-ROLL RUBBER mills, also new lab. 6" x 12" & 6" x 16" mixing mills and calenders, & other sizes up to 84". Extruders 1" to 3". Proctor & Schwartz 6-fan, 3-apron conveyor dryer. Baker-Perkins mixers 100, 50, & 9 gals., heavy-duty double arm. Ball & Jewell & Leominster rotary cutters. Bethlehem 2000-ton 10-opening hydraulic molding press. Large stock hydraulic presses from 12" x 12" to 48" x 48" platens from 50 to 2000 tons. Hydraulic Pumps and Accumulators. Crushers, Churns, Rubber Bale Cutters, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT CO., 90 WEST STREET, NEW YORK 6, N. Y.

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WANTED—TO EXPEDITE PRODUCTION—RUBBER MAKING machinery including Banbury Mixers, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set-up plant now operating or shut down. When offering, give full particulars. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

INTERESTED IN VARIOUS SIZES AND TYPES HAND VULcanizing presses. What have you? Address Box No. 1124, care of INDIA RUBBER WORLD.

WE ARE INTERESTED IN PURCHASING ALL TYPES OF RUBber machinery consisting of mills, Banbury mixers, extruders, calenders, vulcanizers, etc., and also complete plants. Address Box No. 1129, care of INDIA RUBBER WORLD.

VULCANIZER, 12 FT. x 60 INCHES, WITH QUICK-OPENING door, track, etc. Also good 60" mill with drive, etc. For cash. P. O. Box 869, Alliance, Ohio.

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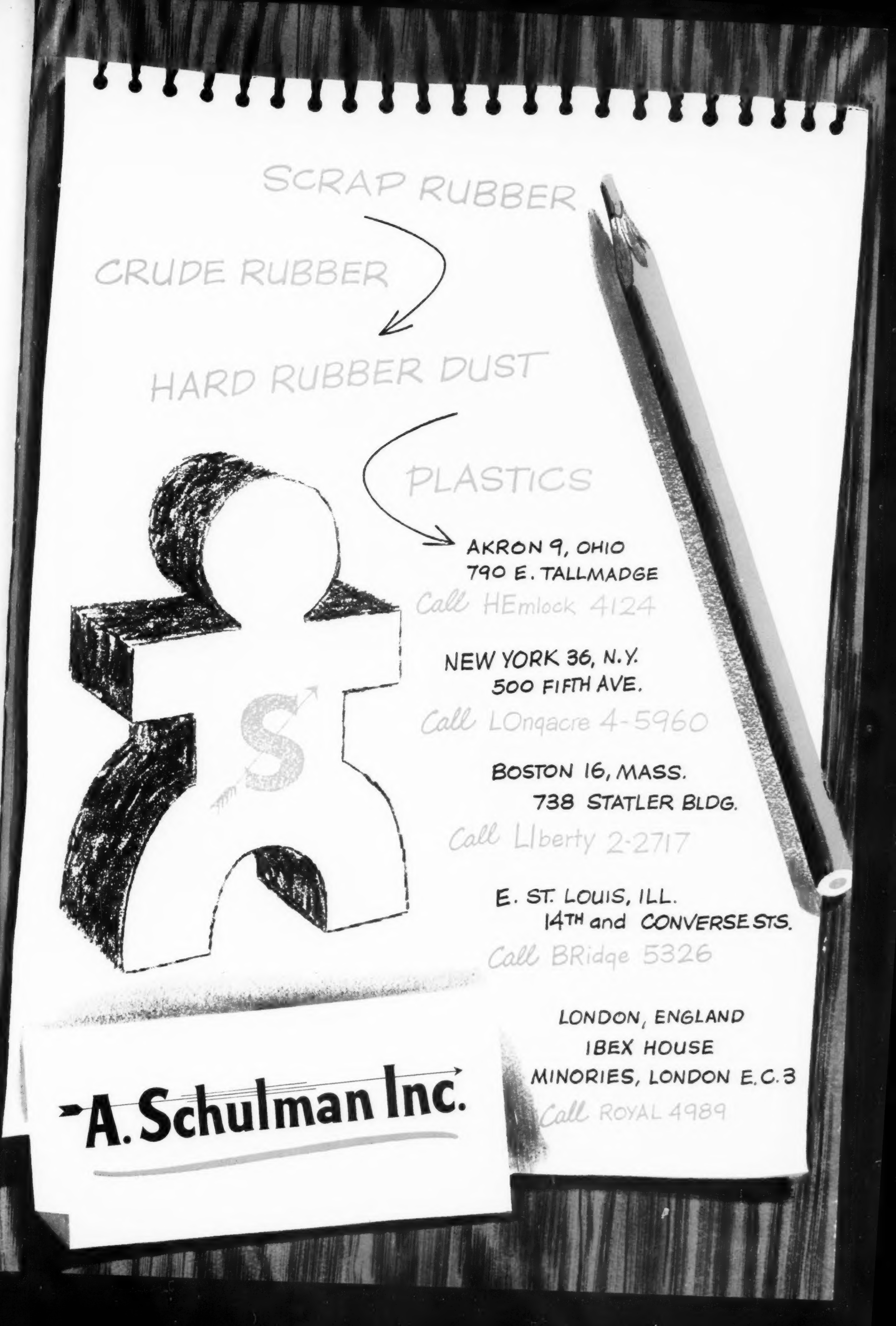
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